COMMITTEES AND COMMISSIONS IN PRE-INDEPENDENCE INDIA : 1836-1947

Volume 3 : 1897-1902

The Book

The Commissions in the British administration have been known as Royal Commissions and had their origin in the functioning of the King during the beginning of the second millennium that we have just left behind.

The thirties of the nineteenth century were crucial for the development of the Commission and Committee system in Britain. The institution of Royal Commission was given a new boost by the Whig Party in the early thirties that led to the appointment of many Royal Commissions in India by the time the nineteenth century was to come to an end. It is very significant, therefore, that included in these volumes are the Commissions and Committees starting with the thirties of the nineteenth century.

The end of the nineteenth century was marked by the devastation caused by certain diseases that appeared with almost regular frequency. It would be useful to study the reports of the panels on the Nature of Kala-Azar (1898) and the Indian Plague Commission (1898). Kala-Azar shows its head occasionally in some parts of India even today. Similarly, even though it was believed over the past many years that Plague was a thing of the past, its appearance in western India recently made us sit up and rethink about this still lurking menace.

Important economic and financial subjects covered in this volume are the reports on the Indian Currency Committee (1898) and Famine Commission (1897 and 1901).

The onset of the twentieth century made the British Government concentrate on infrastructural administration and tightening the loose ends in different areas of governance. Thus we see in these initial years of the century panels like the Indian Famine Commission (1901), Indian Irrigation Commission (1901-03), Indian Police Commission (1902-03) and the Railway Commission (1902).

The material provided about the Commissions and Committees is quite useful and even comprehensive. It provides the names of the Chairmen/Presidents and the Members of a particular Commission or Committee, the necessary details of its Appointment, the Terms of Reference, the list of contents (chapters, sections, etc.) and, at the end, the all important Recommendations.

It is hoped that contemporary researchers would make a positive use of these reports and benefit from their findings, keeping in view, all the time, the colonial biases that might be a significant feature of these reports.

COMMITTEES AND COMMISSIONS IN PRE-INDEPENDENCE INDIA

1836-1947

Volume 3 : 1897-1902

With an Introduction by
M. ANEES CHISHTI

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INTRODUCTION

Independent India has had numerous problems in the process of self-governance. All systems of governance had to be organised on set principles and considerations of national interest. It was the job of the leaders of the government as well as the opposition following independence in 1947, and particularly after the enforcement of the Constitution of the Republic of India, to evolve a system of credible probe and enquiry into various sectors of the polity. As a consequence, we see a very well organised system of Commissions and Committees of Enquiry to go into any serious matter of national concern in a thorough manner, before arriving at any new legislation or action plan. Before prescribing remedies for any situation of ailment, the real nature of the maladies has to be known and that has been done in a remarkable manner through the functions of the various Commissions and Committees that have performed very useful roles in the first fifty years of our Constitution at work.

While the Government and the opposition parties put in their efforts in establishing a tradition of enquiries through Commissions and Committees set up under the provisions and powers of the Parliament and the State Legislative Assemblies in independent India, the picture was not the same under a British dispensation prior to the country's independence.

The concept and method of enquiry in British India were not bound by the country's own national interests. They had to be useful for the overall paradigm of the British Government and its interests in India and, perhaps, in its other territories, going by the example of the developments in the large and pluralistic territory of India.

It would be interesting to go into a little bit of the background of Commissions and Committees under the British administration, to throw some light on the system of enquiry in the period covered by the volumes of this comprehensive publication.

The Commissions in the British administration have been known as Royal Commissions and have their origin in the functioning of the King during the beginning of the second millennium that we have just left behind. The Royal Commissions were consequential in the era before the Parliament and the institution of the Cabinet of the Government. The affairs of the state were enquired into through the Royal Commissions and the Privy Council. The system of these agencies had matured by the beginning of the sixteenth century. At the beginning of the seventeenth century, the two Houses of the British Parliament had evolved a well-defined and regulated system of Parliamentary and other Committees.

The thirties of the nineteenth century were crucial for the development of the Commission and Committee system. The institution of Royal Commission was given a new boost by the Whig Party in the early thirties that led to the appointment of many Royal Commissions by the time the nineteenth century was to come to an end. It is very significant, therefore, that the compilers and the publishers of this important work have chosen to start the study of the Commissions and Committees at the thirties of the nineteenth century and present in these volumes the details of the large number of such bodies during the period of the boom.

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A study of the nature and coverage of the Commissions and Committees of the boom period would reveal the true motivation behind their appointments. They were appointed to know the lacunae in the administration of the country by the British, particularly after a firm notice had been served on the British masters of India by the rebellious Indians in 1857. Only after detecting the shortcomings, the loose ends could be tightened, be they in the management of prisons, the operation of the penal code, sale of and tax on salt, the famines that could be the cause of unrest, different areas of the economy, the crucial sector of education, the conditions in the matter of narcotics, or even tackling health issues like Plague, Kala-Azar or Leprosy where success could create favourable public opinion about the alien government among the people, at least in the consequential urban areas.

The functioning of the Commissions and Committees in independent India, talked of earlier, is vivid in the memory of today's Indians. Their records of evidences and research coverage are also widely available in the libraries and other collections that have come up in the country after independence. But similar records of Commissions and Committees that worked and submitted their reports prior to independence are not as easily available. But for a few depositories or archives, the reports of these bodies are hard to access. Herein lies the value and usefulness of the labour of the compilers and the publishers of these volumes.

Even if the detailed reports of these Commissions and Committees were available, it would require tremendous effort to study them in full. Only very motivated and resourceful researchers could perform this enormous task. It has, therefore, been rather generously and stoically resolved to give the details of appointment and recommendations of these investigating bodies in a nutshell. This condensation would, as it were, provide the incentive (or disincentive) to go further and study these reports in great detail by those researchers whose agenda of research so requires.

The material provided in the description of the investigating bodies is more than a bird's eyeview. It provides the names of the Chairpersons and the Members of a particular Commission or Committee, the necessary details of its appointment, the Terms of Reference, the list of contents (chapters, sections, etc), and, at the end, the all important Recommendations.

In an investigating body, the Terms of Reference are very crucial, as these have to be according to the motivations or administrative requirements of the appointing authority. While a Committee is supposed to restrict itself to the Terms of Reference, a Commission may, on many occasions, opt to go beyond the Terms of Reference and study any issue or development if found useful for the enquiry. It would thus be very interesting to study if and where the Chairperson and Members of a particular Commission chose to go beyond the Terms of Reference. The interest in this context attains weight in an effort to find out if at least some of the British officials or legal authorities chose to look beyond their noses and study the Indian realities in all their dimensions, and possibly kept the Indian people's interests at heart rather than merely following the dictates of the government in London that had the primary motivation of making the British Raj as stable and longer lasting as possible, irrespective of the woes and sufferings of the people of the governed land.

The appointing authorities of the Commissions and Committees in British India could be any of the following: (a) the Crown; (b) the Secretary of State for India with instructions from the British Parliament; (c) the Governor-General in Council and the Viceroy of India; and (d) local boards and councils in an advisory role. The reports compiled here fall under these categories and they have been organised in a chronological order rather than in a subject-wise arrangement.

That the findings and recommendations of a Commission of Enquiry are primarily of an advisory nature and it is not mandatory for the appointing government to implement the recommendations of these bodies has been a constant source of disappointment to aggrieved sections that are concerned with the issues that lead to or cause the appointment of an investigating agency. This issue should be debated thoroughly and the need for some mandatory status being given to the recommendations of Commissions and Committees has to be highlighted forcefully. Legislation to this effect is indeed a desirable step, but that does not seem to be very easy to achieve.

In independent India itself where an open and democratic system of governance exists, the voice of the people, particularly the exhortations of the Press to the government to implement recommendations of its Commissions and Committees from time to time, such implementation is found to be often not complied with. And, one can imagine, what degree of arbitrariness might be associated with picking and choosing of recommendations for implementation by an alien government governing India in case some of the recommendations of an investigating body were unpalatable to the foreign rulers.

There has been no systematic study of the proportion of recommendations of a Commission or Committee that were implemented by the government in different cases. If any such study is conducted for a selected group of Commissions and Committees, that might be a useful indicator of the gap between intentions and actions with regard to the implementation of the vital recommendations arrived at by these bodies after years of lengthy and costly proceedings. This can only be a pointer for the future, as no study of the decisions with regard to implementation of recommendations by the government in the pre-independence India on these lines is possible at this point of time.

To come to some specifics, some of the reports in these volumes are quite relevant even today. Among the health issues, for example, the reports presented here include those of the Committee on Cholera Enquiry (1885), the Leprosy Commission of India (1890-91) headed by none other than the Prince of Wales, the Commission on the Nature of Kala-Azar (1898) and the Indian Plague Commission (1898).

Cholera, incidentally, has not been driven out of the country given the state of environment for public health that we have and recently this disease afflicted the top echelons of our society in a prestigious scientific institution of the Capital. Leprosy, after years of research and treatment in different parts of India, continues even today to be an important subject of study and the government and non-governmental organisations including foreign agencies are involved in massive work on this front. Similarly, Kala-Azar shows its head in parts of India and is taking many lives in the countryside and thus worries our health administrators and agencies greatly. It was thought over the last many years that Plague was a thing of the past, but its appearance in Gujarat recently made us sit up and rethink about the still lurking menace.

The reports of the Commissions and Committees at the end of the nineteenth century on these subjects would be very helpful in a contemporary study of these dreadful diseases afflicting our people. Examples of the past would help correct our perspective today and need to be studied thoroughly to devise the strategy for planning a war against these menaces in today's India.

To take another example, reports of three important Committees on Indian jails have been included in these volumes: Committee on Prison Discipline (1837), the Indian Jail Committee (1864) and the Committee on Jail Administration (1888). Also relevant here is the Committee on the Police Administration of the North-Western Provinces and Oudh (1890). The issue of jail reforms has been actively debated for a decade now and certain measures in the jails of Delhi, especially those mooted and implemented by an enthusiastic woman officer of the Indian Police Service, have been the subject of special interest. Now, these measures may be seen in the context of a colonial situation at the end of the nineteenth century and some useful lessons would be learnt in our process of reforms in at least avoiding those measures of the British Government that were only in the nature of punishment without any concern for the social and economic causes of commitment of crimes and the need to lay emphasis on reforms that could make a law abiding citizen out of a criminal after he or she leaves the jail.

Similarly, a lot is being written and spoken about the need for overhaul of our Police machinery. With the issues of custodial deaths, encounter killings, lack of safeguards in monitoring and preventing crime and restoration of people's faith in the Police as their saviours and supporters the Committee on Police Administration of the British days would be useful in today's context, as it would provide an insight into the functioning of the Police over the many many decades. And, the pitfalls of the colonial days could be avoided after having an account of the situation of those days.

The report of the Famine Commission of 1897 is, likewise, useful as a background for formulation of policies to meet the challenge of drought in a number of States of India today.

The report of the Committee on School Textbooks (1877), the Education Commission (1882) and the Mohammedan Educational Endowments Committee (1885) have immense useful material while we are trying to bring about changes in these fields of education and learning today.

The findings of the Special Commission on Expenditure of the Army (1879), the Finance Committee (1886), the Public Service Commission (1886-87), the Indian Currency Committees (1892 and 1898), the Indian Expenditure Commission (1895) and the

Labour Enquiry Commission (1895) are obviously very useful in the context of our present permanent Commissions concerned with these areas of work.

The onset of the twentieth century made the British Government concentrate on infrastructural administration and tightening the loose ends in different areas of governance. Thus we see in the initial years of the century panels like the Indian Famine Commission (1901), Indian Irrigation Commission (1902-03), the Railway Commission (1902) and the Railway Police Committee (1907), Indian Survey Committee (1904-05), Indian Excise Committee (1905), Telegraph Committee (1906-07) and the Indian Factory Labour Commission (1906). A very important report in this period was that of the Royal Commission upon Decentralisation in India (1907).

In the following decades much attention was devoted to the planning of the new capital of Delhi, after the capital was shifted here from Calcutta. We find some very useful reports on this subject. There was also concentration in this period on the public services. Other Commissions and Committees that gave their reports in the second decade of the century were: the Indian Constitutional Reforms Committee (1917), the East India (Sedition Committee) (1918), the Army in India Committee (1919-20), the Committee on Reorganisation of Medical Services (1919), and the Disorders Inquiry Committee, Calcutta (1919-20), the Committee to investigate the Disturbances in the Punjab, etc. (1919) that has great significance for historians studying India's freedom movement.

Prominent among the panels reporting in the third decade of the twentieth century were the Indian Press Committee (1921), the Royal Commission on the Superior Civil Services in India (1927-28) and the Royal Commission on Labour in India.

The emphasis in the fourth decade was largely on economic matters, the important panels in this categories being the Federal Finance Committee (1913) and 12 Committees on National Planning (1938) including the sub-committees. Also important during this period were the Committee on Representation of Muslim and Other Minority Communities in the Subordinate

Railway Services (1931) and East India (Constitution Reforms), Indian States Enquiry Committee (Financial) (1931).

In the fifth decade, prior to India's independence, the British Government devoted some serious attention to issues in the realms of Education and Labour. The years between 1942 and 1944 were marked by panels on these subjects. Other important panels on the eve of independence were: Indian Railway Enquiry Committee (1946) and the All-India Congress Committee (Congress Agrarian Reforms Committee) (1947).

It is hoped that the contemporary researchers would make a positive use of these reports and benefit from their findings, keeping in view, all the time, the colonial biases that might be a significant feature of these reports.

November 30, 2000. **M. ANEES CHISHTI**

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FAMINE COMMISSION, 1897 — REPORT[1]

DECEMBER 23, 1897

President Mr. J.B. Lyall
Members Mr. T.W. Holderness; Mr. T. Higham; Mr. J. Richardson; Mr. B.K. Bose
Secretary Mr. John Peter Grant

Appointment

The Commission was appointed with the approval of Her Majesty's Secretary of State under the orders of His Excellency the Governor General in Council contained in the Resolution of the Government of India, Department of Revenue and Agriculture, No. 35-245-26 (Famine), dated the 23rd December, 1897.

Terms of Reference

(*i*) To examine the manner in which the provisions of the Famine Codes of the several provinces differ from one another, and in which their prescriptions have been departed from;

(*ii*) To inquire into the degree of success which has in each case attended the measures adopted, considered primarily with regard to the relief of distress and the saving of human life, and secondarily with regard to economy;

(*iii*) To advice as to the measures and methods of working which seem likely to prove most effective in these two respects; and

(*iv*) To make any inquiries and record any recommendations or opinions which it is thought will prove useful in the case of future famines.

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[1] Office of the Superintendent, Government Printing, Calcutta, 1898, 7 Vols. (including Evidences).

Contents

Introductory; Narratives of the Famines and Scarcities which have occurred between the date of the Famine Commissions Report, 1880 and the Famine of 1896-97; Differences in the prescription of the Provincial Famine Codes; The Matters in which the Prescriptions of the Provincial Famine Codes have been Departed From; The Degree of Success that has Attended the Measures Adopted; Recommendations as to Measure and Methods of Working; Gratuitous Relief, and the Relief of Adult Defendants and Non-working Children of Workers; The Aboriginal Hill and Jungle Tribe; Special Relief to Weavers; Utilisation of Private Charitable Contributors; Order and Successive use of the Various Methods of Relief; Other Opinions or Recommendations; Subject of Native States.

Scope of the Inquiry

The following are the full description of the object and scope of the inquiry directed:

> "The organisation for the relief of distress which has been elaborated in each province on the lines laid down by the Famine Commission of 1878, and embodied in the Provincial Famine Codes, has now, for the first time in most of the affected provinces, been practically tested on a large scale; and on the whole it has stood the trial well. But while the experience of the past year has suggested no alterations in them in lines which were prescribed as the basis for the administration of relief, it has been found necessary, in almost every province, to depart in some not unimportant respects from the detailed provisions of the local Code in order to meet the differing conditions of distress. And the direction which these departures have taken has varied from province to province.
>
> The experience thus gained will be of incalculable value when India is next face to face with famine. But in order to render it available for future guidance, it is essential to collect and collate it while the facts are fresh, and to embody it in amended Famine Codes. It is no doubt the case that, while the broad lines upon which relief is to be administered

may properly be prescribed for the whole of India, variations in detail will be necessary under the varying conditions to be found in the several provinces, and that each province must retain its individual Code. But it is certain that almost every province will have something to learn from the experience of others, and it will be advisable to take special measures to collate that experience; and especially, where the cost of relief and the numbers relieved have been larger than elsewhere in proportion to the acuteness the distress and the population affected by it, to enquire to what causes the excess was due, and whether an adherence to the lines followed in other provinces might not, on a future occasion, reduce the cost without diminishing the efficacy of the measures to be adopted.

The enquiry will be far narrower in scope than that entrusted to the larger Famine Commission, which was appointed with such signal advantage in 1878. Twenty years ago no general famine policy had been enunciated by Government, the experience gained in Behar in 1873 and in Southern India in 1877 from what were virtually experiments in relief, was all that was available, and the Commission had to formulate a policy and to evolve general principles for guidance in the actual presence of famine. But this was, perhaps, the least important portion of their duties. They were also bidden to consider and advise upon measures of the widest possible nature, such as might 'diminish the severity of famines, or place the people in a better condition for enduring them'. The programme that was laid down by them accordingly, under the head of 'Measures of protection and prevention' has since then been actively prosecuted; and though much still remains and always will remain to be done the omissions and defects are fully recognized, and are gradually being dealt with as opportunity offers, and no further general inquiry of this nature is either necessary or advisable. So, too, the experience of the past year has shown that the general lines of policy laid down in 1878 stand in no need of reconsideration. It is the details of the scheme of relief that require to be revised. But in such a matter details are hardly less important than principles."

It is to be understood that the object of the inquiry is to furnish guidance for the future; and that it is concerned with the past, only in so far as may be necessary to that end.

Recommendations

The following is a summary of the recommendations as to methods and measures of working which we have made in this chapter :

I. *Programmes of works.* All relief works should be classed in the programmes under the heads of "public works" and "village works" (paragraph 407). The responsibility for maintaining an effective programme of "public works" should be thrown more definitely on the Public Works Department (Paragraphs 408-412). The preparation of a programme of "village works" should rest with the civil officers, but if the "public works" programme is unavoidably deficient, the Public Works Department should take up the "village works" programme and work it out in full details (Paragraph 413).

II. *Test works.* Should if possible be under professional supervision and the test should be a task not less than by the code scale; the maximum wage earnable by the workers should not exceed the code wage of their class nor be less than it by more than one pice. Payments should be made in strict proportion to results without the provision of a minimum wage, and allowances for a day of rest, or for dependents, should not be given by the Collector without the sanction of the Commissioner or some higher authority. We think the above system will be found generally suitable, but as it may be too repellent in some places local Governments should have discretion to substitute for it any system of work not more liberal than the ordinary task-work system of the codes (paragraphs 414-415).

III. *The general policy as to large and small (or public and village) works.* When large and useful public works are available they should be opened as soon as possible after distress has declared itself in an unmistakable manner, no small works being thereafter maintained within a reasonable distance. Public works should from the commencement from the backbone of the relief operations. Agricultural works undertaken by the village landowners, with or without advances from Government wholly or partially recoverable, should be utilized at the early stage of distress to provide employment for small cultivators and others who cannot easily leave their villages. As the hot weather advances operations on the large public works should be contracted and village works gradually opened. (paragraphs 178, 406 and 416)

IV. As soon as *distress requiring relief* is recognised in a district, some one of the code methods for managing relief works should be substituted for the ordinary contract system in the case of all public works intended to afford relief (paragraph 418).

V. *Systems of payment by results.* We have described certain systems which experience seems to show may be adopted with advantage in place of the ordinary code task-work system at certain stages of relief operations, and we recommend that provision should be made in the revised provincial codes for power to use one or more of them subject to the condition that separate provision is always made for the weakly. None of these systems are in our opinion suited to the stage of acute distress or actual famine (paragraphs 215, 418 and 461).

VI. In respect to *the policy of contracting ordinary public works in time of famine*, we think that so far as Imperial or Provincial finances and establishments may possibly permit they should be fully maintained or expanded in districts not recognised as actually distressed, but in which there is reason to suppose the existence of an exceptional demand for labour (paragraphs 421).

VII. All relief works, or at any rate all of the "public works" class, should as far as possible be conducted under some professional supervision. As to the agency by which relief works should be carried, we recommend that in a wide-spread famine the Chief Engineer, acting under the close control of the local Government in the

Famine Department or of the Famine Commissioner, should responsible for the general direction of all relief works entrusted to the execution of the officers of the Public Works Department, and that under the Chief Engineer, and subject to the special powers of Commissioners of divisions and Collectors of districts in respect of famine relief the chain of departmental responsibility should remain as at ordinary times. When famine is less extensive, we think that the control may be less centralised and that the primary responsibility for the management and efficiency of the relief works should rest with the Divisional Commissioners and the Collectors; Public Works officers, in districts in which there is no district board engineer, or the work is beyond his capacity, being in such case deputed to have immediate charge of the relief works under the Collector's orders, and one or more Superintending Engineers being directed to co-operate with the Commissioner or Commissioners as famine duty professional adviser and assistant (paragraphs 235-237 and 422).

VIII. *Responsibilities of officers of the Public Works Department and their position and relation to civil officers.* These should not be too rigidly defined. The principle laid down in Section 130 of the Famine Commission's report should be fully observed. The Commissioner within his division and the Collector within his district should have a power of general control over all reliefs operations, including relief works under the management of the Public Works Department, and should be primarily responsible to Government for their efficiency in affording relief. The Collector's decision when he considers it necessary to interfere should be accepted pending reference to superior authority in all matters relating to the employment and wages of the labourers, the opening or closing of works, the payment of feeding of dependants, and generally in all other matters which are not of a strictly professional nature. But except in cases of unusual urgency such orders should be communicated by the Collector to the Executive Engineer or other engineer officer having control, and not direct to his subordinates resident on the works. When the conduct of relief works is entrusted to the Public Works Department as a department, the Superintending Engineer in his circle and the Divisional Engineer in his Division will be directly responsible to the Chief Engineer for their proper conduct by their subordinates in accordance with the rules of the Famine code and such supplementary orders as may be issued by Government or the Famine Commissioner if such an officer is appointed. They should however in such case, by personal communication and otherwise, keep themselves in constant touch with the Commissioner and Collector on all matters not of a strictly professional nature, and must accept their orders in such matters pending reference to superior authority, if they think it necessary to interfere (paragraphs 423).

IX. *Civil officers and officers in charge of relief works.* We attach importance to the principle of appointing a civil officer to each large work of group of smaller works managed by officers of the Public Works Department to have charge of matters affecting relief, or in other words of all matters not relating to construction and direction of the work, and we define his special duties. But in order to avoid division of authority on the works we recommend that the services of these civil officers should be placed at the disposal of the Public Works Department for famine duty, and that the Superintending Engineer or Divisional Engineer should, in communication in doubtful cases with the Commissioner or Collector, determine whether the civil officer of the Public Works officers whose special duties are those of construction and direction of labour should be the "officer in charge" of a particular work (Paragraph 426).

X. We recommend a new classification of relief workers, the main feature of which is that the bulk of the labourers will be divided into two classes, viz., "diggers" and "carriers". We recommend the abolition of sexual sub-divisions within the same class, and make definite proposals for the treatment of adult dependants and non-working children and working children (paragraphs 439-445 and 450).

XI. We adhere to the full ration of the provisional code but make a slight alteration in the minimum ration, and we have devised a standard wage-scale based on these rations which we think can be applied to the new classification we propose (paragraphs 446-456). One result of our proposals as to classification and wages is that we revert to the principle laid down by the Famine Commission that all able-bodied labourers capable of performing not less than 75 per cent of a full task should be entitled to the full wage, while in the case of labourers incapable of performing 75 per cent of a full task we follow the principles laid down in the provisional code and restrict their wages to 75 per cent of the full wage (paragraphs 450 and 462).

XII. A system of cash daily wage to be calculated in full pice (and not in pies) is recommended (paragraph 457).

XIII. A limit of permissible deviation from the standard wage-scale which we propose is suggested in order that local Governments may have the necessary discretion to adjust the wages actually earned to the requirements of existing circumstances (paragraphs 458 and 459).

XIV. Rest day allowances should be made to all workers, except where payment is made by results of rates calculated to allow seven days' subsistence to be earned by six days' work (paragraph 465).

XV *Returns and accounts.* We make suggestions for securing uniformity and simplicity in these (paragraph 467).

XVI. *Gratuitous relief.* We consider the provisional code's definition of persons eligible to receive gratuitous relief sufficient in ordinary circumstances, provided it is properly and liberally interpreted. We think it necessary however to point out that persons of the classes described in that definition should not be considered ineligible for village relief because the bread-winners of the family are employed on relief works, and propose that they should be freely allowed the option either to go to relief works as dependants or to apply for village relief (paragraphs 468-470). In two exceptional cases we consider that an expansion beyond the provisional code definition may properly be allowed. These are first in the case of aboriginal hill and jungle tribes, and second at the commencement of the rains when it is impossible to provide suitable work fairly adjacent to the homes of the people (Paragraph 471). We attach great importance to the early organization of village relief and village inspection (paragraph 472). The dole to be given in village relief is specified (paragraph 474).

XVII. *Non-working children and adult dependants of relief workers.* All the codes should contain provision for both systems of relieving these persons, namely, either by feeding them in kitchens or by means of cash or grain allowances given to the workers for their support. As a general rule, we are in favour of the kitchen system in the case of children (paragraphs 475-476). When relief works are conducted on a system of payment by results, it will rest with the local Government to decide whether the wages or rates paid to the workers should be so adjusted as to leave a margin for the support of their dependants, or whether separate allowances should be given dependants. Preference should be given to the latter course when distress is at all severe (Paragraph 477).

XVIII. *Poor houses.* It is a matter for local discretion to decide when poor houses should be opened. The ration to be given in ordinary circumstances is the minimum ration as modified by our proposals, but officers in charge should have full discretion to give special rations (Paragraph 478).

XIX. The relief of aboriginal hill and jungle tribes should be a specialised branch of relief operations. Detailed suggestions for effecting the relief of these people are made (paragraphs 479-491).

XX. *Special relief to weavers in their own craft.* When weavers are congregated together in considerable numbers they should be relieved in their own trade provided the net cost is not likely to materially exceed either (a) the net cost of relieving them by employment on ordinary relief works or (b) the net cost of relieving them by gratuitous village relief. A set of rules is recommended for adoption (paragraph 508-11).

XXI. *Utilisation of private charitable contributions.* A revised definition of the objects of a charitable fund is recommended for adoption (paragraph 527).

From the above summary of our recommendations it will be seen that in the matter of the broad principles of relief administration we adhere very closely to the recommendations made by the Famine Commissioners in 1880. It is only in matters of detail that we have proposals to make, and these proposals are more of the nature of an expansion of the principles laid down in 1880 than of divergencies from them. Indeed in some cases the result of our investigations has been to lead us to revert to the recommendations of the Famine Commission, where in fact they have in some respects and in some provinces been since departed from. We assert the necessity for concentrating the control of all the various branches of the administration concerned in famine relief, and maintain the responsibility of the chief civil officers of divisions and districts for effectively supervising and controlling all the measures of relief undertaken within their respective charges. The recommendations we make regarding the responsibilities of the officers of the Public Works Department for the conduct of works entrusted to the direction of the department are in strict conformity with these considerations, and our proposals merely put in a more uniform and definite shape what we believe to be the general intention of the various and sometimes rather indefinite provisions of the existing codes. In the all important matters of the system under which relief works should be conducted, we adhere to the task-work system of the codes as the only system which is really effective when famine is at all severe. Our recommendations as to the adoption of any of the systems of payment by results which were so largely resorted to during the recent famine are of a permissive nature, and are intended to restrict such systems to circumstances other than those of acute famine. In making these recommendations we do not depart from the principles of the Famine Commission who intended that piece-work, or payment by results, should, when suited to the circumstances of the time or the locality, be largely used for the relief of the able-bodied.

Our recommendations as to the classification and wages of workers are based upon and are intimately connected with the principles laid down by the Famine Commission, the object of our proposals being only to secure simplicity and facility of working and a certain elasticity in application which it is essential to obtain. In the equally important matter of the administration of gratuitous relief, it will be found that the few recommendations we make constitute no real departure from the principles hitherto accepted. The general result of the experience gained during the recent famine is to show that the existing codes have been framed in almost all respects on suitable lines, and to confirm the principles on which they are based. Our recommendations, if accepted, should render the codes more adaptable to all the varying conditions to which they have from time to time to be applied, and supply some deficiencies in the few matters in which they are not sufficiently precise.

Other Opinions or Recommendations

Introductory Remarks : In the previous chapters we have endevoured to answer the specific questions obtained in the first three paragraphs of our instructions. The final paragraph invites us to make any further inquiries and record any further opinions which it is thought will prove useful in future famines.

Section I

The Famine Relief and Insurance Grant

Under this head we have in the first place thought it advisable and permissible to make a summary inquiry into the working of the Famine Relief and Insurance Grant, in order to see whether there were any recommendations in connection with that scheme which might in our opinion be usefully submitted. The scheme, in its first form, owed its introduction to the pressure of the great famine of 1877-78. Before that the obligation of the State to do all that is possible towards preserved, and for some years the principle had been urged that famine relief must be regarded as a charge liable to constantly recur, which must be met like all other increase of permanent debt. The occurrence of the great famine of 1877-78, and its great cost, strongly enforced these conclusions, and induced Lord Lytton's Government to take measures to create new resources by which in normal years a surplus of revenue could be secured to meet the extraordinary changes thrown upon the State in time of famine. With this object certain new taxes calculated to provide the greater part of the desired surplus were imposed by legislation. In connection with this new taxation, though not in dependence on it, Lord Lytton's Government offered a pledge to the people of India that due provision should be made by yearly grants, not only for famine relief, but also for famine insurance. The sum of the annual provision or grant was fixed by Lord Lytton's Government at Rx 1,500,000 until a less sum should be found sufficient. This sum was based upon actual famine expenditure in the 10 years preceding, and the Famine Commission on the same basis arrived at nearly the same amount by a wholly independent calculation : but it may be mentioned that it appears from the responsible utterances made by Lord Lytton and his Financial Minister on more than one occasion, that at the time they anticipated that this sum would form an assurance against extraordinary losses of revenue in famine years as well as against the actual cost of famine relief; and though they were pledging themselves to a special scheme, it is clear that the main object they had in mind was the general financial result. The simple object was in fact to provide so far as possible an annual surplus of one and a half crores for famine relief or famine insurance expenditure. To the extent to which in any year the amount was not spent on relief, it was to be spent solely on reduction of debt, or rather, upon avoidance of debt, which is the same thing. Such avoidance was to be effected by spending the money on productive public works, the cost of which would otherwise have been met by loans.

Measures taken for the proper carrying out of the Scheme

In the budget for 1878-1879 the grant required by the scheme was made, but in the budget for 1879-1880, owing to war and financial difficulties, it was suspended. In the accounts only actual famine relief expenditure, if any, was shown; the surplus secured by the new taxes and arrangements was merged in the surplus or deficit of the general finances. This obscurity in the accounts and the suspension of the budget grant in 1879-1880 led to much protest by the public, and attracted the attention of the Secretary of State to the subject. In his despatch of 23rd December, 1880 the Secretary of State took exception to a statement made by Sir John Strachey to the effect that, whether the public accounts show surplus, equilibrium, or deficit, the new taxes must prevent debt by the amount they yield and that was sufficient. The Secretary of State held that to fulfil the pledges of the Government and satisfy of the public, some greater security for the proper carrying out of an insurance scheme must be obtained. The Government of India concurred in the view taken by the Secretary of State, and after correspondence the whole scheme was reconstituted in 1881. It was decided that the full grant of one and a half crores should always be entered in the Budget under the head of Famine Relief and Insurance, with sub-heads for (1) Relief, (2) Protective works, and (3) Reduction of Debt; and that in the accounts and expenditure should be shown under the same heads, the third item being treated, quoat this special account, as expenditure, for the better information of the public, though from a financial account point of view it is not technically expenditure. In the annual account under the special head the charges to the sub-heads were to be regulated as follows: The actual expenditure on famine relief, if any, in the year was to be a first charge upon the whole grant. Protective works were to be the next charge. To reduction of debt was assigned only the balance, if any, left after the charges for relief and protective works had been met.

This description of the new scheme for settlement of 1881 shows that by this time the original policy of devoting the whole of the grant, less actual cost of famine relief, to reduction or avoidance of debt had been changed by the acceptance of the view that a large part of the grant might be better applied to what are called Famine Protective, as distinct from Productive Public Works. This view was agreed to in 1879, from a conviction of the urgency of carrying out such works, as recommended by the Famine Commission; and upon the theory that such works may be expected either to prevent famine or to render its relief less costly when it occurs. The share of the grant intended to be annually allotted to protective works by the scheme was three quarters of a crore or half the full grant, but expenditure under this head was to be cut down by stopping or reducing works in years when expenditure under relief in excess of half the grant might be anticipated; so as to maintain, as far as possible, the principle that relief was a first change upon the whole grant.

Working of the Famine Relief and Insurance Scheme since 1881-1882

The arrangements briefly described above were to come into force from 1881-82, and they constitute the Famine Relief and Insurance Scheme in what may be called its later form. It was part of the new scheme that Commissioners for managing the reduction of debt should be appointed, but as that provision very soon became inoperative, it does not seem necessary to discuss it. It is this new scheme, with some slight modifications that have been since approved by the Secretary of State, which we have considered. The following table exhibits the working of the scheme from 1881-1882 to 1897-1898 (Table 1). It is only from the former year that the account is held to have been running.

It should be understood that the sum spent under the fourth heading count as money spent on protective works, that mode of using the grant to promote the construction of protective railways by private enterprise having been sanctioned in 1886. It will be seen that the cost of actual famine relief during 17 years has amounted to Rx 7,791,989 and that during the same period an expenditure of Rx 12,872,509 has been incurred on protective railways and irrigation works, the object of which has been either the prevention or mitigation of famine, or the facilitating of measures of relief. In addition Rx 5,327,299 has been applied to the reduction or avoidance of debt. Including this amount the total expenditure under the scheme on Famine Relief and Insurance has amounted to Rx 25,991,797 which gives an average of about Rx 1,530,000 or a little more than one and a half crores, per annum. But it may be noticed that the table also shows that the expenditure for the 15 years ending 1895-1896 amounted only to Rx 17,644,185 or an average of Rx 1,176,279 per annum, and that the ultimate average for the

Table 1 : Famine Charges

	In the 15 years ending 1895-1896	Actuals, 1896-1897	Total up to the end of 1896-1897	Revised Estimate 1897-98	Total up to the end of 1897-1898
	Rx	Rx	Rx	Rx	Rx
1. Spent upon actual Famine Relief.	320,664	2,079,525	2,400,189	5,91,800	7,791,989
2. Spend upon construction of Protective Irrigation Works	1,813,841	46,830	1,860,671	22,400	1,883,071
3. Spent upon construction of Protective Railways	6,550,931	—	6,550,931	—	6,550,931
4. Spent in Meeting Interest upon the Indian Midland and Bengal Nagpur Railways	3,631,450	438,857	4,070,307	368,200	4,438,507
5. Charged as reduction and avoidance of debt, that is, as famine surplus	5,327,299	—	5,327,299	—	5,327,299
Total	17,644,185	2,565,212	20,209,397	5,782,400	25,991,797

17 years ending 1897-1898 has been brought up to Rx 1,530,000 only in consequence of the extraordinary expenditure on famine relief during the last two years necessitated by the occurrence of severe famine. If the scheme had been fully carried out in all respects for the first 15 years the total grant for that period would have been 22½ crores, of which 11¼ crores would have been allotted to Protective works, and instead of Rx 5,327,299 a sum of nearly 11 crores would at the end of 1895-1896 have been the famine surplus available to meet the heavy famine expenses of the two following years. It will be seen, however, that the actual expenditure within the 15 years on account of protective works amounted to Rx 11,996,222 which is more than the half share of the full grant allotable to such works under the scheme. In respect to such works, therefore, the intentions of the scheme as approved by the Secretary of State appear to have been fully carried out, on a series of years if not annually, and the short appropriations have affected only the head of reduction of debt. The question whether they have affected this head really or only nominally seems to depend upon whether they were inevitable or could have been avoided by measures of economy in the general administration of the finances. If the short appropriations were inevitable it may be said, as we understand the matter, that their only effect has been to reduce the amount of the famine surplus, by which we mean the sum shown under the special head of Famine Relief and Insurance as applied to the avoidance or reduction of debt. This would be a mere matter of account, for the sum which is actually devoted annually to the avoidance and reduction of debt is the amount of the famine surplus plus the budget surplus, and a pro forma increase of the former would have resulted in a corresponding decrease in the latter.

Apparent Reasons for Short Appropriations

The short appropriations to the famine grant during the 15 years ending 1895-1896 appear to have been attributable partly to financial exigencies and partly to a belief that was at one time held that the cost of famine had been over-estimated, and could be met by a grant of less than 1½ crores annually. The actual working of the scheme in this respect is clearly shown by the first seven columns of the following table (Table 2), taken from

Table 2 : Actual Working of the Scheme

Years	Famine relief	Construction of protective irrigation works	Construction of Protective Railways		Reduction or avoidance of debt.	Total	Declared surplus (+) of deficit (–) in accounts
			Charged under Famine Relief and Insurance	Charged under Railway Revenue Account			
	(Rx)	(Rx)	(Rx)	(Rx)	(Rx)	(Rx)	(Rx)
1	2	3	4	5	6	7	8
1881-1882	34,883	135,449	682,403	—	715,151	1,567,886	(+) 3,595,451
1882-1883	22,103	263,443	-133,129	—	1,343,555	1,495,972	(+) 675,837
1883-1884	9,205	283,233	649,248	—	581,137	1,522,813	(+) 1,879,707
1884-1885	7,350	253,046	946,457	—	341,504	1,548,357	(–) 386,446
1885-1886	40,695	186,807	589,000	29,271	643,498	1,529,271	(–) 2,801,726
1886-1887	1,041	107,979	200,000	151,812	—	460,832	(+) 178,427
1887-1888	402	91,006	—	285,199	—	376,607	(–) 2,028,832
1888-1889	7,799	70,537	—	430,182	—	508,518	(+) 37,018
1889-1890	68,288	71,457	—	462,009	460,255	1,062,009	(+) 2,612,033
1890-1891	5,579	74,392	—	482,351	520,00	1,082,351	(+) 3,688,171
1891-1892	23,423	77,931	484,795	231,681	682,170	1,500,000	(+) 467,535
1892-1893	70,841	60,793	984,469	383,897	—	1,500,000	(+) 833,412
1893-1894	496	56,351	1,060,954	371,768	—	1,489,569	(–) 1,546,998
1894-1895	10,258	43,110	556,867	389,765	—	1,000,000	(+) 693,110
Total of 14 years	302,363	1,775,524	6,021,064	3,217,935	5,327,299	16,644,185	(+) 6,228,875
1895-1896 (Revised Estimate)	10,500	40,200	534,800	414,500	—	1,000,000	(+) 951,400
Total of 15 years	312,863	1,815,724	6,555,864	3,632,435	5,327,299	17,644,185	7,180,275

Part I of the Financial Statement for 1896-1897. The last column shows the declared surplus or deficit of the general accounts for each years. This column has been deficient, yet if the surplus in the general account for the whole series of years is considered, the object of the scheme will be found to have been secured.

It will be seen that in 7 years out of the 15 the expenditure against the grant was limited to the actual outlay on famine relief and on protective works, and that there was no famine surplus applied to the avoidance or reduction of debt. In regard to the last column it should be noted that the actual surplus for 1895-1896 was Rx 1,533,998 instead of Rx 951,400 shown in the revised estimates, and allowing for this difference the net surplus by the general account for the 15 years amounted to Rx 7,762,873. This is in addition to the famine surplus of Rx 5,327,299 shown as expenditure in reduction of debt under the Famine Relief and Insurance Scheme account during the same period. The table shows, therefore, that although the exigencies of finance or other considerations prevented Government from completely fulfilling its self-imposed obligations, the finances as a whole had been so administered as to practically fulfil the policy of insurance involved in the scheme. In other words that an aggregate surplus of over Rx 13,000,000 had resulted to the end of 1895-1897, which by causing the reduction of avoidance of debt to the same amount gave the borrowing power necessary to meet the cost of the great famine in the two following years. The only question that seems to arise as to the sufficiency of this explanation is whether the existence of declared surpluses in the general account, which would have been extinguished or reduced if full appropriations had been made in the Famine Relief, and Insurance account, may not have sometimes encouraged the incurring of new expenditure not absolutely necessary.

Opinion as to the Maintenance of the Famine Insurance Grant at the Full Amount Originally Fixed

In a communication from the Government of India of October 1885 a description of the objects of the Famine Insurance Scheme in its later and present form is given, and again in the same communication the question of the periodical revision of the amount of the grant is referred to. We are not aware of any present intention of reducing the amount: our own study of the subject would not lead us to recommend any alteration of the sum at which the famine insurance grant was originally fixed. On the contrary, we are of opinion that it should be maintained at the full amount of a crore and a half. We have shown in paragraph 534 that the average expenditure for the last 17 years under the scheme has been up to that figure, and so long as half the amount is devoted to protective works, as we think it should, for reasons given below, there seems to us to be no case for reduction. If we try to estimate the working of the scheme on its present basis for the next 20 years, and assume that the full grant of one and a half crores is appropriated annually, the total grant for the period will be 30 crores. The cost of relief in the same time, if simply calculated from the actual cost for the 17 years ending in 1897-1898, may be put at 8 crores, and the cost of protective works at say 14 crores (allowing for such reduction as can be made in the two or three years in which relief will absorb the whole grant or more than half of it). This leaves a surplus of 8 crores to be shown under the sub-head of reduction of debt. Such a surplus does not seem too great if we consider the indirect cost and losses attributable to famine, which we refer to further on, and the impossibility of forecasting the direct cost of relief with any accuracy. We may not have again such a long period without extensive famine as occurred between 1881-1882 and 1895-1896. Experience shows that on the occasion of a wide-spread failure of the rains such as was recently experience, railways, however useful and necessary they may be, do not keep down prices to a point at which slight pressure only is left. So far as they equalise prices, they widen the area of scarcity though lessening the intensity elsewhere of famine. Though they bring grain to tracts liable to famine in years of drought, they also prevent large accumulations of grain in those tracts in years of plenty. The Government of India must reckon not only on frequent small local famines, but also on the occasional recurrence of widespread droughts, and experience shows that in spite of all railway facilities such a drought will cost over seven crores of rupees in direct charges, and will cost much more than this if it is continued into a second year. A further consideration involved is the fact that the standard of relief, and of promptness in affording it, is certain to rise. We have mentioned in our report some instances in the late, and other recent famines, where, in our opinion, hesitation to commit the State to the great expense of famine relief led to loss of life which might have been avoided. The very perfection of communications and of the system of relief organization conduces to this rise to standard; and since it is found possible to so extend relief as not only to prevent death, but also to maintain strength and prevent absolute ruin, the impulse of humanity impels the State to widen the scope of its relief measures and to make them more costly.

Budget Estimates to include the Full Grant for Famine Relief and Insurance

We consider, therefore, that in accordance with the existing scheme the budget estimates should be so framed as to include a full grant of 1½ crores for Famine Relief and Insurance Scheme, and we recommend that, if any time financial exigencies should necessitate a contraction of the grant, the amount by which it is reduced should be made good by an addition to the grants of subsequent years in which conditions may be more favourable. It is true that a surplus shown in the annual accounts of the Empire is in its financial effects the same as a famine surplus shown under the Famine Relief and Insurance account, but we think that the adoption of our recommendation might tend to economy, and that much misapprehension as to the working of the Famine Relief and Insurance Scheme would be removed if the famine grant were maintained, as far as possible, at a constant amount, and the balance remaining after meeting the charges of the year for relief and protective works were distinctly shown in the accounts as a famine surplus.

Amount to be Devoted to Protective Works, Irrigation in Preference to Railway Works Recommended

As regards the share of the full grant to be ordinarily allotted to protective works, we may begin by observing that the annual charge for interest upon the Indian Midland and Bengal-Nagpur Railways, which we have described above in paragraph 534, varies according to the net revenue of the railways concerned, but appears to average about Rx 400,000 per annum. This charge is peculiar in as much as it must be met in full even in famine times; if not from the grant then from other resources. It cannot be avoided by postponing work, as ordinary charges for protective works can. The amount may be reduced in time, but at present may be regarded as a fixed and recurring annual charge against the fund, and is the price paid by the State for the large protective value of these railways which traverse some of the districts most seriously affected during the late famine. This liability has to be borne in mind in considering the amount of the grant. As regards protective works in general, their construction from the Famine Relief and Insurance grant was originally justified by the prospect their largely preventing famine and diminishing future outlay on relief. No doubt they will have effects in this direction, but we are not sanguine as to the degree. We are disposed to agree largely with the following opinion expressed by Sir John Strachey in which we believe he had railways specially in mind: "The true object of these protective works is go give increased security against the greatest dangers that arise in extreme drought, to supply the means of saving life, and of averting and misery, rather than to cause an eventual reduction in the cost of famine relief." We do not in fact expect that these protective works can be trusted to materially reduce the outlay on famine relief in the near future. Nevertheless we are of opinion that the existing policy of spending half the grant on works of a bonafide protective character is one that is justified by the increased degree of immunity from famine it will gradually produce, and by the other benefits it will confer on the country: and we recommended that it should be continued as long as a suitable programme of such works is forthcoming. This is our opinion, though we do not forget that all expenditure on such works diminishes proton to the famine surplus that would otherwise be made available to meet the cost of future famine. We understand that so as long ago as 1886, Major Baring recommended that the whole of nearly the whole of the three quarters of a crore allotable to protective works should be spent on irrigation in preference to railways. As the interest on the Indian Midland and Bengal-Nagpur Railways now constitutes a first charge on the grant, the balance available for the construction of new protective works will, at any rate for some time to come, never exceed

Rx 350,000; and provided always that a suitable programme is forthcoming, we think that the greater part, if not the whole, of this amount should be devoted to protective irrigation works. It appears to us that most of the necessary protective railways have now been constructed, that there is a possibility of others being constructed on their merits as productive works or as feeders to the trunk lines of railway without assistance from the famine grant, and that under existing circumstances greater protection will be afforded by the extension of irrigation works which would not otherwise be undertaken by the construction of railways of that kind. It may we think be added that as the bulk of the revenue, and of the special taxes imposed in 1878, is paid by the holders and occupiers of land, and as the State in India in generally in the position of superior landlord, there are special reasons why the Government should undertake without expectation of direct return works peculiarly protective of agriculture, such as irrigation works.

Expenditure and Loss of Revenue Attributable to Famine Outside the Account

In considering the working of the Famine Relief and Insurance scheme we have not referred to expenses and losses of revenue attributable to famine which are outside that account. The following table (Table 3), compiled from tables given in the Financial Statement for 1898-1899, purports to give an approximate estimate of such losses and expanses for the two years 1896-1897 and 1897-1898 :—

Table 3 : Losses and expanses for the years 1896-97 and 1897-98

Item	1896-1897	1897-1898
	Rx	Rx
Compensation for high price of provisions and other charges due to famine	766,100	1,048,500
Remissions of land revenue	871,600	576,400
Loss of revenue under salt, excise, customs and forests	576,700	663,700
Loss of railway revenue	1,504,100	1,477,400
	3,718,500	3,766,000
Deduct —		
Increase of revenue due to irrigation	424,900	556,700
Net total	3,293,600	3,209,300

The total loss or cost shown by the above table amounts to the large sum of Rx 6,502,900 a very serious addition to the direct cost of famine, the effect of which on the general finances has to be borne in mind. The first two items are reliable; the others are said to be mere approximation, and are in fact little more than a guess. It is not possible to estimate what the indirect cost under these heads has been for the 17 years since 1881-1882. We have no estimates, nor would they be of much value if prepared. As to the land revenue remissions, the real amount for 1896-1897 and 1897-1898 is likely to be somewhat greater, as some of the revenue suspended will probably be ultimately remitted. But it should be remembered that these remissions, though a most useful and necessary form of remembered that these remissions, though a most useful and necessary form of relief in famine times, are not strictly famine expenditure. The duty and policy of making such remissions to the landholders, in years of absolute and abnormal failure of crops from any cause, is an old obligation on the State, based on its original title to take land revenue. They are often made in years in which no proper famine relief is granted. They are not allowed in permanently settled tracts, and in temporarily settled districts the large increases generally taken when the terms of settlement fall in may be considered to cover any balance of them not covered by the Famine Relief Insurance Scheme. We take this opportunity of remarking that any want to proper liberality in granting these remissions in times of great loss of crops and cattle, would in our opinion be inconsistent with the present policy of readiness to make great changes of laws and regulations in the hope of saving the agricultural classes from indebtedness. This seems plain, but with a strongly departmental system of Government such an inconsistency is not impossible. Each department is apt to find reasons for its own hard and fast rules, though it is apt to cry out against the rigidity of those of other departments.

The loss in Railway traffic receipts appears to have occurred on the guaranteed lines leading to Bombay, and was attribute to plauge and was attributed to plauge and famine. It must have been difficult to distinguish the share attributable to famine. In some former famines the result was to increase railway traffic receipts. Excise is an item which fluctuates from year to year in accordance with the means of the lower classes; more than half the decline shown in the table seems to have occurred in the North-Western Provinces. The immense decline in the affected districts of these Provinces is evidence of the severity of the distress, and of the close economy of the relief afforded. Under the head of customs, a large part of the decline seems due to diversion to India of rice from Burma which would ordinarily have been exported to foreign ports, and would have then paid duty. The forest revenue for India as a whole shows increase in the two years. There must no doubt have been some loss in certain tracts, but we think it must have been small and very difficult to calculate correctly.

The increase of revenue due to the greater demand for irrigation in seasons of drought is an important set-off against the loss of revenue under other heads. We refer again to this subject below in paragraph 579.

Section II

Irrigation

General Recommendations of the Famine Commissioners

The Famine Commissioners, in Chapter V, Part II, of their report, remarked that "among the means that may be adopted for giving India direct protection from famine arising from drought the first place must unquestionably be assigned to works of irrigation." They pointed out that the true value of these works could not be measured by their financial success considered only with reference to the net return to Government on the capital invested in them, but that account must also be taken of the direct protection afforded by them in years of drought by the saving of human life and by the avoidance of loss of revenue remitted, and of the outlay incurred in costly measures of relief, while in seasons of average rainfall they are of great service and a great source of wealth, giving certainty to all agricultural operations, increasing the out turn per acre of the crops, and enabling more valuable descriptions of crops to be grown. After giving some figures showing the value of irrigation works in different provinces in this respect, they remarked that in spite of the ill-success of some works "the actual experience is altogether opposed to the view that the existing works of this class, taken as a whole, are otherwise than positively remunerative to an extent which completely justifies the measures which the Government of India has carried out for their extension during the last 20 years or more." They showed that the net revenue on all these works in the year 1879-1880 amounted to very nearly 6 per cent on the capital expenditure, which included £ 3¼ millions on works was not yet brought into operation. Their general conclusion was expressed in the following words :

> "Viewing the provision of irrigation works as a mean of affording an insurance against drought, the Government may, we think, properly regard them as a class of undertakings which should be treated as a whole, so that any unusual facilities obtained in one direction may be set off against special difficulties in another, and the general financial outcome of the entire class may be accepted as a sufficient test of the policy that should regulate their treatment. Thus considered, and bearing in mind that it has never been the desire of Government to manage these works with a view to show great profits, the actual results which have been stated appear to us entirely satisfactory, and such as to justify their continued prosecution with all suitable precautions to ensure economy of construction."

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The Commissioners then made detailed recommendations for the improvement and extension of irrigation in those provinces in which it was most needed. We now propose to consider first the general progress that has been made in the extension or irrigation since 1879-1880, and next the extent to which effect has been given to the Commissioners' recommendations for each province.

Classification of Irrigation Works

Irrigation works are divided into three classes —

I. Productive works,
II. Protective works,
III. Minor works.

The capital cost of productive works is not charged to Revenue, but is provided for out of loan funds. These works include all the larger irrigation systems. Although some works have been included in this class which are never likely to be remunerative, no works have for many years been sanctioned under it unless there was reason to believe that they would prove remunerative in a strictly financial sense. It is only on this condition that the construction of irrigation works out of loan funds is permitted.

Protective works are those which have been constructed as a protection against famine out of the grant for Famine Relief and Insurance Scheme. Such works have been sanctioned when the prospects of their proving financially remunerative have not been sufficiently clear to justify construction as productive works, while the cost was too considerable to be undertaken as a charge against the ordinary minor works grant. Expenditure was first incurred on protective irrigation works in 1881-1882, and no reference is therefore made to them as a class in the Famine Commissioner's report, although some of the works recommended by them have since been sanctioned under this class and completed.

Minor works are those which are constructed out of ordinary revenues, other than the Famine grant. For all the more important works capital and revenue accounts are maintained, but this is merely for the sake of showing more clearly their financial results. The expenditure shown as capital is met from ordinary revenue and not from loan funds, and no interest charges are therefore made against these works. The Famine Commissioners in their report have made occasional allusions to some of these works, but their remarks were mainly confined to the productive irrigation works, the progress on which since 1879-1880 will now be considered.

Productive Works : Capital Outlay Since 1879-1880

The capital outlay on productive irrigation works at the end of 1879-1880 was reported by the Famine Commissioners as amounting to Rx 20,298,000. The capital outlay at the end of 1896-1897 on these works, including one purely navigation work, the Hidgili Tidal Canal, amounted to Rx 31,252,948. The capital expenditure during 17 years has therefore amounted to Rx 10,954,948. This however includes a sum of Rx 1,742,246 paid to the Madras Irrigation Company when the Kurnool-Cuddapah Canal, to which reference is made in the Commissioner's report, (Chapter V, Part II, paragraphs 49-52.) was taken over by Government, and excluding this the actual capital expenditure since 1879-80 has averaged Rx 540,000 per annum.

Extension of Irrigated Area Since 1878-1879

The areas irrigated by productive irrigation works in the three years preceding the issue of the Famine Commissioners' report were as below:

	Acres
1876-1877	4,027,758
1877-1878	4,736,017
1878-1879	5,171,497

During the three years ending 1896-1897 the areas irrigated by productive irrigation works have been:

	Acres
1894-1895	6,099,952
1895-1896	7,775,936
1896-1897	9,448,692

The years 1877-1878 and 1896-1897 were famine years, and the areas in the latter year was abnormally high, although that of 1897-1898 will not fall far short of it. The year 1894-1895 was unfavourable for irrigation in many provinces owing to abundant and opportune rainfall; the areas in the two years preceding averaged about 7,000,000 acres.

Return on the Capital Outlay

The net revenue of productive irrigation works in 1879-1880 amounted to Rx 1,165,800, or, as reported by the Famine Commissioners, to nearly 6 per cent. On the whole capital outlay.

The returns for each province during the three years ending 1896-1897 are as below (Table 4):

Table 4

Provinces	1894-1895	1895-1896	1896-1897
Punjab	4.30	5.37	9.47
North-Western Provinces	5.56	3.45	7.68
Madras	7.16	7.34	7.14
Bombay (Sind)	6.00	5.59	6.30
Bombay (Deccan and Gujarat)	1.95	2.18	1.45
Bengal	0.09	0.19	0.83
Total	4.29	4.10	6.35

The returns for 1894-1895 and 1895-1896 were below the average, while those for 1896-1897 were increased in consequence of the strong demand for irrigation in a famine year. The effect of this demand will however appear more fully in the accounts of 1897-1898, when according to the revised budget estimates the return will have been not less than 7½ per cent. It may thus be said that although the capital outlay on productive irrigation works has been increased by over 50 per cent, since the report of the Famine Commissioners, an average return on about 6 per cent is still realized and that the new projects and extensions undertaken since 1879-1880 have been financially as profitable as the works constructed before that date, in spite of the fact that the outlay subsequent to 1879-1880 includes the purchase from the Madras Irrigation Company of the Kurnool-Cuddapah Canal, with a capital account of Rx 2,171,349, barely pays its working expenses.

Surplus Revenue Derived from Works after Meeting all Interest Charges

The remunerativeness of these works may be shown in another way. Taking them as whole, including the works which are never likely to be remunerative and those not yet opened or in full operation, the surplus revenue realised to the end of 1896-1897, after paying all interest charges and working expenses, amounted to Rx 4,829,917, the surplus for the year 1896-1897 itself being Rx 809,173. The interest charges are calculated throughout at 4 per cent.

Number of Productive Irrigation Works

There are altogether 41 productive irrigation works. For 14 of these all interest charges incurred during construction and until they were fully developed have been paid off, while on six others the accumulated interest is being annually reduced and will be eventually cleared. There are 13 works which have proved unremunerative, and are never expected to repay the accumulated interest charges on the capital invested on them. Twelve of these were undertaken prior to the introduction of the rules now in force which lay down the conditions to be fulfilled before a work can be classed as productive. The amount of the capital expenditure on these works at the end of 1896-1897 was Rx 7,509,821. There remain eight works out of the 41, either under construction or not in full operation, the remunerativeness of which has yet to be ascertained. The capital outlay on these eight works to the end of 1896-1897 amounted to Rx 1,264,653.

Protective Works, Capital Outlay on Protective Works

In addition to the capital outlay incurred on productive works since 1879-1880 a sum of Rx 2,099,253 had been spent on the construction of protective irrigation works up to the end of 1896-1897, of which however Rx 1,698,424 only has been charged against the grant for Famine Relief and Insurance. Expenditure has been shown against 9 projects, some particulars of which are shown in Table 5.

The Swat River Canal was originally sanctioned as a productive work, but there was afterwards reason to doubt whether it would fulfil the prescribed conditions for works of that class, and it was therefore completed as a protective work. It has however proved more successful than anticipated, and is really a productive work; the net revenue has for some years exceed the interest that would be chargeable had the work been constructed from borrowed money, and represented in 1896-1897 a return of 6.52 per cent. The Gokak Canal, to the cost of

Table 5

Province	Name of work	Capital outlay to end of 1896-97	AREAS IRRIGAGED			NET REVENUE		Net Revenue to end of 1896-97
			1894-95	1895-96	1896-97	1896-97	1897-98	
		(Rx)	(Rx)	(Rx)	(Rx)	(Rx)	(Rx)	(Rx)
North-Western Provinces	Betwa Ganal	428,086	8,041	35,292	87,306	– 1,400	3,500	– 42,178
Madras	Rushikulya Project	447,937	27,389	35,197	63,327	1,985	2,600	3,478
Bombay	Nira Canal	566,550	28,370	23,453	42,553	1,597	6,000	8,285
	Mhasvad Tank	207,250	4,226	3,481	7,547	– 102	100	– 1,845
	TOTAL	1,649,823	68,026	98,143	200,733	2,080	12,200	– 32,260
	Gokak Canal	41,267	—	—	—	—	—	—
	Chankarpur Tank	7,225	—	—	—	—	—	—
	Maladevi Tank	3,006	—	—	—	—	—	—
	Shetphal Tank	748	—	—	—	—	—	—
Punjab	Swat River Canal	397,184	91,892	81,210	123,087	25,896	30,000	1,424,009
	GRAND TOTAL	2,099,253	159,918	179,353	323,820	27,976	42,200	1,391,749

which Rx 41,267 has been contributed from the Famine Fund, has since been classed as a minor work, and the last three Bombay works in the table are not in operation. Excluding these five works there remain four, the capital outlay on which has amounted to Rx 1,649,823. The gross revenues from these works taken as a whole does not cover the working expenses during ordinary years, and in 1896-1897, when there was a large extension of the irrigated area due to famine, the net revenue amounted to Rx 2,080 only. The revised estimate for 1897-98 shows a net revenue of Rx 12,200 but this is also a consequence of famine.

Interest is not chargeable against protective works, as the cost of construction is met from revenue, but the capital cost of these four works might have been applied to the reduction of debt to the amount of Rx 64,990 per annum. To this must be added the average annual excess of maintenance charges over gross revenue, which may be taken as amounting to Rx 20,060 to the end of 1897-1898, or an average of perhaps Rx 2,010 making the total cost of Rx 67,000 per annum. This is the price that has to be paid for the protection against famine afforded by these four works.

Areas Irrigated by Protective Works

The extent of this protection is indicated by the areas given in the table (Table 5), from which it is seen that over 200,000 acres were irrigated from these works in districts which were all subject to severe famine, the result being a considerable addition to the local food supply, and the provision of agricultural employment on their own lands for thousands who must otherwise have required State relief, while the necessity for considerable remissions of land revenue must have been avoided. Allowing for all this it must be admitted that expensive works of this character, the capital cost of which averages over Rs. 80 per acre irrigated even in famine year, should be undertaken only in districts in which cultivation is exceptionally precarious and drought is of frequent occurrence, unless there is the prospect of a net revenue which will represent a moderate return, though less than 4 per cent, on the capital cost. It may be observed, however, that better returns were anticipated from all these works when they were sanctioned, and that the failure to attain them has been due to causes that were not foreseen, while it is possible that one consequence of the greater utilisation of their power or irrigation during the late famine will be that water will be more freely taken in future, and that their financial position will improve. On the other side may be set the unexpected success of the Swat River Canal, and although this would have been more properly classes as a productive work, the general results of the expenditure on productive irrigation works are not unsatisfactory when this too is included.

Minor Works : Importance of Minor Irrigation Works

The irrigation effected by minor works is very extensive and important, and deserves some notice. Many of these are old irrigation works constructed by former rulers of the country, or more recently by district boards or private individuals, which have been taken over the State, while the number constructed *ab initio* by Government is comparatively few. Some of the systems are of great size, irrigating several hundred thousand acres, but little or no capital expenditure has been incurred on them, though sufficiently ample grants have been made annually for their effective maintenance and gradual improvement. There is some difficulty in determining the financial results of these works, as much of the revenue attributable to them is indirect, forming an abritrary portion of the land revenue assessed on the lands served by them, while in some cases there is old irrigation to be distinguished from areas brought under new irrigation in consequence of the improvements effected by Government. It has on this account never been proposed to class these works as productive, or to undertake extensions and improvements out of borrowed money. Provision is however, made for the maintenance of minor works out of ordinary revenue, the annual grants usually including a considerable sum for new works or the improvement or extension of old works when regular estimates for these have been sanctioned.

It has already been stated that for some of the larger works proformed capital and revenue accounts have been maintained, while for others revenue accounts only are kept up, the cost of improvements, etc., being charged to working expenses. For both these classes of minor works the irrigation revenue reports and administrative accounts give ample information. There remains however a third class of generally petty works for which neither capital or revenue accounts are maintained, concerning which there is less information. These works are of importance only in Madras, where the expenditure incurred in 1896-1897, a normal year, was Rx 187,342 the area irrigated was 2,849,185 acres, and the net revenue, mainly indirect, dependent on the works, amounted to Rx 516,959. We shall refer again to these works, but it may be noted here that the average area of the irrigation annually effected by them is about equal to that on all other irrigation works in this presidency taken together. In the next paragraph the expenditure on minor works for which no revenue accounts are kept is excluded for consideration.

Expenditure on Minor Works since 1879-1880

The total expenditure incurred since 1879-1880 on minor irrigation works, excluding those for which neither capital nor revenue accounts have been kept, amounted to Rx 8,27,214 to the end of 1896-1897, or an average of Rx 486,718 per annum. The direct and indirect revenue attributable to works of this class to the end of 1896-1897 has exceeded the expenditure incurred on new works and on maintenance by over Rx 6,346,729. It is convenient to show the financial results in this way because for many works capital accounts have not been kept, while on others the charges which have been made to capital have often been nominal only, the cost of improvements, however permanent, being charged to revenue. For those works however, for which capital accounts have been kept the net revenue for 1895-1896 and 1896-1897 yielded a return of 8.24 and 9.13 per cent respectively on the recorded capital outlay. The financial results of the expenditure on minor works have therefore been very satisfactory.

Increase in Area Irrigated by Irrigation Works of all Kinds since 1879-1880

The increase in the area irrigated by productive and protective works since the Famine Commissioner's report was written has already been shown. The following table (Table 6) shows the total areas irrigated under each class of works in the three years ending 1878-1879 and in the three years ending 1896-1897. The irrigation under minor works includes that effected from works for which no revenue accounts are kept, although no account has been taken of the expenditure on such works in the preceding paragraph. During the latter period there has also been some irrigation on minor works in Upper Burma, but the areas are not included in the table, although expenditure on minor works in Burma has been included in the amounts shows in the preceding paragraph.

Table 6

Year	Irrigation in India, excluding Burma			
	Productive Works	Protective Works	Minor Works	Total
	Acres	Acres	Acres	Acres
1876-1877	4,027,758	—	5,448,199,	9,475,975
1877-1878	4,736,017	—	5,873,614	10,609,631
1878-1879	5,171,497	—	6,547,019	11,718,516
Total 3 years	**13,935,272**	**—**	**17,868,832**	**31,804,104**
1894-1895	6,099,952	159,918	7,228,324	13,488,194
1895-1896	7,775,936	179,353	7,199,716	15,155,005
1896-1897	9,448,692	323,820	7,442,990	17,215,502
Total 3 years	**23,324,580**	**663,091**	**21,871,030**	**45,858,701**

It will be seen that the area irrigated by State irrigation works during the latter triennium has been nearly 50 per cent. In excess of that recorded during the former, but the increase shown is not entirely due to State expenditure. Of that under 'production works', 954,907 acres represent the areas irrigated during the last three years from the native States' sections of the Shirhind Canal and the Sirsa branch, Western Jumna Canal, the capital cost of which has been defrayed by the states concerned. The increase under minor works is partly due to the transfer to State management of minor works previously constructed. The table shows however that irrigation from protective and minor works together is about equal to that from productive and minor works together, but that the expansion in the last in a famine year, such as 1897, is much greater than in the others. This is due to the more assured supply on most of the productive works which is available to meet an increased demand, whereas in the case of many protective and minor works the supply is seriously affected in the years of drought, though it is satisfactory to note that these works were able, taken as a whole, to irrigate a larger area in 1896-1897 than has ever been previously recorded. The area irrigated by productive works in 1894-1895 was much below the average, owing to abundant rainfall.

General Results of the Extension of Irrigation Since 1880

We have now shown in general terms the great extension in State irrigation which have, in accordance with the recommendations of the Famine Commissioners, taken place since 1880, and that the result has been a great advantage to the State, regarded merely from the direct financial return on the money invested, and apart from their value in increasing the wealth of the country in ordinary years, and in preventing or mitigating famine in years of drought. We will now consider in greater detail the extent to which the specific recommendations made by the Commissioners for each province have been carried out.

Extensions of Irrigation in the Punjab (Cis-Sutlej)

The first recommendation of the Commissioners was the fuller protection of the tract lying between the Jamuna and Sutlej rivers by the completion of the Sirhind Canal and the construction of the proposed Sirsa branch of the Western Jamuna Canal. The former was formally opened in 1882, irrigation commencing in the following year. In 1896-1897 it irrigated 1,338,080 acres, including 394,291 acres from the native states branches. The Sirsa branch was commenced in 1889, and completed in 1895-1896, the area irrigated in 1896-1897 amounting to 217,572 acres, of which 62,416 acres were in Patiala territory. In addition to this many important extensions of the old Western Jamuna

Canal have been carried out, principally in the Rohtak and Hissar districts, while the whole canal has been remodelled so as to increase its capacity and remove the defects in its original construction and alignment. In the famine year 1877-1878 the area irrigated by this canal amounted to 507,974 acres, which was the highest on record until 1895-1896, when it amounted to 667,609 acres. In 1896-1897 a total area of 739,752 acres was irrigated, of which 217,572 acres were on the Sirsa branch, and 522,182 acres on the old canal. The canal afforded almost complete protection during the late famine to the Karnal, Delhi, and Rohtak districts, but only partial protection to Hissar, of which district a large portion cannot be commanded by it, while as to the rest the supply of water available from the Jumna is not sufficient to justify many further extensions. A portion of this district will, however, be benefited by the canals below Sirsa which were constructed during the late famine for the utilisation during the monsoon season of the water in the Ghaggar river.

Extensions in the Punjab (Trans-Sutlej)

The Commissioners next suggested that other canals might be made which, though not so urgently necessary for famine protection as those just referred to, would bring under cultivation large areas of waste and uncultivated land in the Muzaffargarh, Multan, Montgomery, Jhang, Gujranwala and Sialkot districts, and that apart from the new works necessary for this purpose the policy should be pursued of extending the inundation canals or minor irrigation works in these districts. Much has been done to increase the efficiency of the Sutlej and Chenab inundation canals, which serve portions of the Lahore, Montgomery and Multan districts; and the inundation canals in Muzaffargarh, which draw their supplies from the Chenab and Indus, were taken over by Government in 1881, and have since been greatly extended, the irrigated area having been increased from about 180,000 to 300,000 acres. Two new productive works, the Lower Sohag and Para, and the Sidhnai canals, have been constructed for bringing under cultivation large areas of waste land in the Montgomery and Multan districts. These have been successfully colonized, the area irrigated in 1896-1897 amounting to 208,377 acres.

The Chenab Canal

The most important new productive work which has been undertaken for the purpose of giving effect to the recommendations of the Famine Commissioners is, however, the Chenab Canal, which has been designed to irrigate annually about 1,300,000 acres in the Gujranwala, Montgomery and Jhang districts. The area commanded is 3,823 square miles, of which 2,829 square miles or over 70 per cent were until lately Government waste land. This work was originally designed as a small inundation canal, and was commenced as such in 1883. It was subsequently decided, however, to construct it as a perennial canal, and to enlarge its scope, so that it might command the whole of the Rechna Doab, except where the spring level was less than 40 feet below the natural surface. Work was started on the new scheme at the end of 1889-1890, and permanent headworks were completed and opened in April 1892. The extensions of the canal and the gradual colonisation of the waste lands have been since progressing simultaneously, and the whole work will be practically completed in 1899. The area irrigated in 1896-1897 amounted to 520,279 acres, and the revenue realised yielded a return of 6.75 on the whole capital cost, including that incurred on the branches which have not yet been completed.

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Attraction of Population to Un-cultivated Tracts on Introduction of Irrigation

The Famine Commissioners referred to the objection that the remunerativeness of works for extending irrigation to waste and uncultivated tracts might be affected by the scarcity of the population, but expressed an opinion that if canals were opened in such districts a sufficient population would not be long in growing up. Experience has demonstrated the soundness of this opinion. The preliminary experiments on a comparatively small scale on the Lower Sohag and Para and the Sidhnai Canals showed that this difficulty had been exaggerated, and were very useful in indicating the precautions to be taken to ensure the success of colonisation on the larger scale which has been attempted in the case of the Chenab Canal. The success has been complete. Up to the end of 1896-1897 no less than 550,000 acres had been allotted to settlers drawn from the more densely populated districts of the Punjab, and the land allotted to them was immediately broken up and brought under cultivation. For the lands remaining to be allotted the difficulty is not to find settlers, but to select the most eligible among the crowd of applicants. Those to whom land has been allotted have brought their families and have settled down, substantial homesteads have been erected in the new villages, and there are indications on all sides that the prosperity of the settlers is as assured as the financial success of the canal.

Other Extensions of Irrigation in the Punjab

Apart from the measures thus recommended by the Famine Commissioners, others have been taken for extending irrigation in this province. The Swat River Canal in the Peshawar district has been completed as a protective work, and irrigated over 123,000 acres in 1896-1897. Minor irrigation works have also been constructed from provincial funds in the same district, and promise to be very successful both financially and as a protection against drought. The Bari Doab Canal - which traverses the Gurdaspur, Amritsar and Lahore districts has been remodelled, enlarged and extended, and large areas of waste land have been brought under cultivation in the last of these districts. The effect of these improvements has been to more than double the irrigated area, which amounted to 327,558 acres in 1878-1879 (the maximum until then recorded), and to 731,942 acres in 1896-97. In the Shahpur district a number of inundation canals, which up to 1879-1880 had never irrigated as much as 10,000 acres, have been improved and extended, and in 1896-97 irrigated over 35,000 acres. A project for a perennial canal to take out from the Jhelum river and irrigate the lower portion of the doab lying between this and the Chenab river has been prepared and has received formal sanction, though it's construction has been held in abeyance pending the completion of the Chenab Canal. Ground was, however, broken on this work during the late famine for the sake of finding employment for relief labourers in the Gujarat district and its regular construction will soon be taken in hand.

Extension of Irrigation in the North-Western Provinces

As regards the Gangetic Doab the Famine Commissioners remarked that all that was required was the completion of the Lower Ganges Canal, of the distributaries of the Upper Ganges Canal, and of the important drainage works that had been found necessary. The Lower Ganges Canal has been completed with the exception of its Fatehpur branch, which is now in full progress and will shortly be opened. The delay has been due to the disaster which occurred to the Kali Naddi aquaduct on the main line of this canal, which was swept away by the extraordinary floods of 1885, but has since been rebuilt. The other recommendations have been carried out.

The Sarda Canal

The Commissioners next referred to the modified project for the Sarda Canal in Oudh, which would provide for the irrigation of 600,000 acres annually at an estimated cost of Rs. 2,150,000 on which it was said that a return of 5 per cent might be safely anticipated. It had been held in abeyance in consequence of the opposition of some of the principal landowners, but the Commissioners thought that "the scheme ought not to be any longer rejected, unless grave and substantial objections to it can be established." This project has continued in abeyance not only on account of the opposition of the landowners, but because there was serious reason for doubting whether the scheme would be remunerative, and whether it would not result in waterlogging the country. The matter is thus referred to at pages 141-42 of the Resolution of the Government of the North-Western Provinces and Oudh on the administration of famine relief in those provinces in 1896-97:

> "In October last year the failure of the crops threatened to be greater in Outh than elsewhere, and the question of undertaking the Sarda canal as a relief work came again under discussion. The magnitude of the work, however, was so great, while the injury to the country, if a mistake were made, would be so far-reaching, that the Lieutenant-Governor decided not to enter on this great undertaking as

a famine relief work without careful preliminary enquiry. But in view of the possibility that the famine might continue for longer than a year, Sir Antony MacDonnell considered it desirable to come to some decisions on the question whether a canal could be advantageously made or not. Accordingly, Mr. M. King, Superintending Engineer, was deputed to enquire into the merits of the project, and he spent four months of the cold whether in doing so. Mr. King's report has not yet been finally considered; but it may here be said that, in his opinion, Sitapur, Hardoi, Lucknow and Bara Banki are the only districts of Oudh into which canal irrigation could be profitably introduced. THE FACTS TO BE DEDUCTED FROM Mr. King's report are, on the one hand, that the water-supply from the proposed canal would be for these four districts practically unlimited, that a canal could be made for about 4¼ cores, which would possibly return 5 per cent on the outlay, (The question of return is very uncertain.) and that these districts would be protected from the effects of drought, their wealth greatly increased, and about 265 square miles of shallow tanks reclaimed for *rabi* cultivation."

On the other hand, the report shows that there are sèrious, though probably not insuperably, difficulties attaching to the project, arising from the high spring level of sub-soil water, nature of sub-soil and drainage. The construction of the canal continues to be viewed with disfavour by a large though a decreased proportion of landowners and cultivators and there is some doubt whether adequate water-rates could be realised.

"The matter is still under the Lieutenant-Governor's consideration: but the facts which have been established by Mr. King's enquiries show the prudence of the decision which rejected the work as a famine relief measure."

The last word of this subject has therefore not yet been spoken, and it is not possible to anticipate the final decision. The scheme suggested by Mr. King differs entirely from that referred to by the Famine Commissioners and has yet to be considered on its merits. The four districts which it would serve, especially Hardoi, all suffered severely in the late famine, and as a protection against drought the canal would no doubt be effective. But the cost would be so great, the revenue return so uncertain, and the objections which have been raised on other grounds are so serious, that we refrain from expressing any opinion as to whether the construction of this work is desirable.

The Betwa and Ken Canals in Bundelkhand

The Commissioners also recommended the construction of two irrigation works in Bundelkhand, and Betwa and the Ken Canals. They recognized that it was doubtful whether these works would prove financially profitable within any reasonable period, but observed that there was no question of what their value would be in famine. They urged the construction of these works on the ground that "there is no reason to hope that there will not be a recurrence of famine again in Bundelkhand before many years are past. The people of this province have contributed their share of the public revenues which were applied to render their countrymen secure in the Gangetic Doab, and it is surely not too much to ask that they in turn may receive what protection can be afforded them from the same source. They country as a whole must supply what is needed, and the obligation to assist in this more particularly rests on those who have been already placed beyond danger. Nor can it be forgotten that if this help is not now given by constructing irrigation works, the burden may fall on the province any day with tenfold force from having to feed Bundelkhand during famine."

The Betwa Canal has, as already stated, been completed, but has proved not only financially unsuccessful, but more unsuccessful than was anticipated, owing to the fact that much of the soil is of a character for which water is not required, except in very dry seasons, so that in ordinary years the revenue does not cover the working expenses. According to the figures which were before the Commissioners when they made their recommendation the estimated cost of this work was Rx 275,000 the irrigable area was stated to be 98,400 acres, and an ultimate net revenue of Rx 9,600 was anticipated, or about 3½ per cent on the capital cost. The actual cost has been Rs. 428,086, the maximum irrigation in the famine year 1896-1897 has not exceeded 87,306 acres, and the working expenses to the end of 1896-1897 had exceeded the gross revenue by Rx 42,178. The actual cost to the State in loss of interest and in working expenses may be roughly estimated at Rx 20,000 per annum. The value of the crops raised in 1896-1897 has, however, been estimated at Rx 231,081 or more than half the capital cost of the canal, and no doubt many more thousands would have come on to relief if the canal had not been constructed.

The Famine Commissioners stated that the Ken Canal would cost Rx 460,000 the irrigable area being 88,800 acres, and the anticipated net revenue Rx 10,200, or little over 2 per cent. The prospects appeared therefore to be less favourable than those of the Betwa, and owing to the ill-success of the latter it has not been undertaken. The project was again examined in 1896, but the conclusion arrived at was that it should not be taken up until the Betwa Canal had shown better results. But as the Betwa has since irrigated over 87,000 acres in 1896-1897, and as the Ken project seems likely to cost about the same as the Betwa but to give decidely better results, it is now proposed to re-examine the project in greater detail and to bring it up to date. The case will then be reconsidered on its merits, and due weight will no doubt be given to the claims of this district (Banda) in which the distress during the late famine was probably more acute than in any other part of India.

The North Behar Canal Suggested by the Famine Commissioners has not been Constructed

The new works recommended by the Famine Commissioners in Bengal were in North Behar and Orissa. It was stated that in Behar north of the Ganges, extensive irrigation is possible from both banks of the Gandak in Tirhut, Champaran, and Saran, and that irrigation might be afforded to 1,100,000 acres in these districts at a cost of Rx 2,200,000. It was admitted, on the strength of the experience gained on the Sone Canal in South Behar, that it might be only after a long series of ordinary years that the cultivators would freely avail themselves of water, but it was pointed out that the cost of the proposed works would be far less than the sum which it had been found necessary to spend in these districts on famine relief in 1873-1874. They recommended therefore, the preparation of a carefully considered scheme of irrigation from the Gandak, which could be taken up at any time, if thought desirable. The question does not appear, however, to have been taken up, and in view of the very unfavourable financial results on all the productive irrigation works in Bengal, it is doubtful whether such a scheme as that originally suggested, which would involve an annual charge of Rx 88,000 for interest alone, even if the revenue sufficed to cover the working expenses, can be now recommended. A smaller scheme for the protection of the north of Champaran by means of a canal from the Gandak was, however, drawn up at the commencement of the late famine, and famine labour was employed on the excavation of the main channel, the greater part of which was completed. It is said that the estimate for this canal (the Tribeni) amounts to about Rx 340,000, but it has not yet been sanctioned, though it will probably be recommended as a famine protective work.

Extensions of Orissa Canals

In regard to Orissa the Commissioners remarked that up to the 1st April, 1878 a sum of Rx 1,750,000 had been spent on the Orissa Canals but that much of the water ran to waste for want of minor channels to distribute it over the fields, and that the area actually irrigable in that year was 183,000 acres only. We find, however, that the maximum area actually irrigated in one year up to the date of the Commissioners' report was 111,250 acres only, in 1878-1879. It was stated that by a further outlay of Rx 93,000, Rx 405,000 or Rx 1,360,000 the annually irrigable area might be increased to 287,000, 494,000 or 800,000 acres respectively, and the second of these alternatives was recommended in the hope that after being carried out the situation might be encouraging enough to warrant the completion of the system by the adoption of the third. The capital account on the 1st April, 1897 stood at Rx 2,623,703 but the irrigation actually effected in 1896-1897 amounted to 185,048 acres only, the average for the previous five years being 136,837 acres. These canals have a protective value of their own as water communications, but there appears to be little prospect of their material improvement as an irrigating system.

Other Canals in Bengal

The Commissioners also attached much importance to the completion of the line of navigable canal between the Hooghly and Cuttack. This has been effected by the completion in 1888-1889 and 1893-1894 of the Orissa Coast and Hidgili Tidal Canals. They also referred to the possibility of improving the administration of the Sone Canals. The maximum area irrigated by these canals up to the date of the Commissioners' report was 241,790 acres in 1877-1878. In 1896-1897 they irrigated 555,156 acres, while the average area in the preceding five years was 392,921 acres.

Major Irrigation Works in the Bombay Deccan and in Gujarat

In the Bombay presidency there are two distinct irrigation systems, the irrigation works in the Deccan and Gujarat, which depend on the storage of rainfall or draw their supplies from the rivers of the Western Ghats, and the Inundation Canals in Sind. Regarding the former the Famine Commissioners remarked that it would be premature to draw any conclusions as to the future remunerativeness of the Bombay system, which was still in its infancy but certainly did not pay its working expenses. They pointed out the special disadvantages to which these works were subjected owing to the uncertainty of the supplies, the great cost of storage works, the backwardness of the population, and the character of the black soil upon which in ordinary years fair crops of an inferior class can be raised without resort to irrigation. They conclude what "on the whole the Bombay canals must be regarded as a small but moderately hopeful experiment . . . some portions of the scheme are already doing well, and though we may not share the sanguine expectations of the Bombay Irrigation Department it would be premature to say that the outlay has not been judicious. In any case a considerable fraction, more than 200,000 acres, of the most endangered part of the Province has been protected from future famine. Irrigation works in the Deccan should, however, be prosecuted with caution if they are to be justified by financial success, though they might in some special cases be constructed without certain prospect of profit, as a protection against famine. Viewed as a means of promoting the growth of more valuable products, it is probable that there is a section of the agricultural class prosperous enough to utilise the limited supply of permanent irrigation; but we are inclined to think that railways are more likely to be immediately profitable to the Deccan by opening markets and creating a demand for produce, and that these should have first attention."

The Commissioners state that at the close of 1877-1878 the capital outlay on the Deccan and Gujarat irrigation works amounted to Rx 1,280,000. This must have included the outlay on minor works shown as capital, as the total capital outlay on productive works at the end of 1896-1897 amounted to Rx 1,088,862 only. At the end of the same year the capital outlay on protective and minor works amounted to Rx 826,056 and Rx 702,041 respectively, so that the capital account for irrigation works of all kinds amounted to Rx 2,616,959.

There are seven protective works, of which the most important is the system of Mutha Canals in the neighbourhood of Poona, referred to in the Commissioners' report, the capital outlay on which at the end of 1896-1897 amounted to Rx 659,893. This is not a purely irrigation work, as it is also the source of the water-supply of Poona and Kirki, and much of the capital has been expended on the water works, from which also a large share of the revenue is drawn. This work yielded a return of 2.12 per cent only on its capital outlay in 1896-1897, but there is reason to believe that the net revenue will in time cover the interest charges. Two of the other works do not pay their working expenses, and taking the seven as a whole the return on capital outlay for 1896-1897 amounted to 1.45 per cent only. The works therefore are not really productive, and may be considered with the protective works, two only of which are in operation, to which reference has already been made in paragraph 547 *supra*. Taking the nine works together it is found that the average area irrigated annually during the five years ending 1895-96 averaged 56,036 acres only, the average return on the capital outlay being 1.28 per cent only. It is satisfactory to note however that the area irrigated by these works in 1896-1897 rose to 79,926 acres, and this area has been exceeded in 1897-1898, being estimated at approximately 84,000 acres. The works have therefore not failed in years of drought, but on the contrary have been more than ordinarily effective.

Minor Irrigation Works in the Bombay Deccan and Gujarat

Similarly with minor works for which capital accounts are kept, the average area irrigated for five years ending 1895-1896 amounted to 24,088 acres, but this rose to 38,078 acres in 1896-1897, and the area for 1897-1898 is estimated at 39,665 acres. The financial results attained on these works have been even less favourable than on the major works, but there are in addition a number of minor works for which revenue accounts only are kept, which irrigated 144,286 acres in 1896-1897, or more than all the productive, protective and minor works having capital accounts taken together, and yielded a net revenue of Rs. 30,418. The area irrigated in 1895-1896 was 143,805 acres, or practically the same as in the succeeding famine year. The net revenue on these works more than covers the nominal interest charges on the minor works for which capital accounts are kept.

Prospects of Irrigation Works in the Bombay Deccan and Gujarat

The Famine Commissioners stated that more than 200,000 acres of the most endangered part of the province had been protected from future famine. It is not known what was meant by the area protected, but the area actually irrigated in 1896-1897 by irrigation works of all kinds was 262,830 acres. It appears however that on all the works for which capital accounts have been opened, the net revenue does not yield a return of much more than one per cent in ordinary years, and that every acre irrigated in such years costs nearly Rs. 10 to the State. The value of the works in famine years is however very great, and if the profits on the smaller works for which no capital account is kept be also taken into account, the expenditure on these works, taken as a whole, is sufficiently justified. There are signs of a gradual increase in the proportion of higher class crops sown; and if, as observed by the Commissioners, the extension of irrigation which takes place in time of drought is to a great extent maintained in subsequent years, it may be hoped that the financial position of these works will gradually improve. It is understood moreover that the irrigation revenue on these works consists mainly of a direct water rate, assessed on the lands for which water is actually taken in any crop. No credit is given to the works for large areas on which crops may be matured without the aid of canal water, but which would never have been sown if the cultivator had not been assured that he had this water to fall back on if the rains failed. In Madras and other parts of India irrigation revenue on works of this kind is realised in the form either of a share of a fixed land revenue assessment, made with reference to the water advantages, or of a fluctuating assessment which is levied on the areas on which crops are matured, whether canal water has been taken for them or not. We do not intend to suggest that such a system should be introduced in Bombay, as apart from many obvious objections that may exist to such a course, we are unable to tell whether a revised land revenue assessment on these principles would yield on the whole a higher revenue than is now derived from the combined dry assessment and water rate. We merely wish to point out that under the system which now obtains the irrigation works get credit only for the water actually supplied from them in time of need, but get no credit as in some other parts of India for their value as protective and insurance works, or for the loss of land revenue that might be expected to occur if the works were abandoned. This point appears to us to deserve consideration in connection with the financial results shown by these works.

Urgent Necessity for Irrigation Works in the Bombay Deccan

Although it is evident that irrigation works cannot be considered directly remunerative in the Bombay Deccan, we consider that there are few parts of India in which protective works are more urgently required, and we hope that it may be possible to devote some portion of the Famine Insurance Grant to their construction. The experience gained since the report of the Famine Commissioners fully justifies their warning that great caution must be exercised in the prosecution of such works, but we do not think their prosecution should be discontinued. If by any means those who are directly benefited by these works could be made to contribute a larger share of the cost involved in their construction and maintenance, a more active policy might be recommended; but in any case we think that the value of these works should not be judged too strictly by the financial results; and that due credit should be given to the works, even if it cannot be reduced to a quantitative form, not only for the stability of the revenue assessed on the lands dependent on them, which may be small, but also for their great value in such a country, in all seasons of drought, to the people of the neighbourhood as well as to those whose crops are actually secured.

Irrigation in Sind

As to Sind the Commissioners recommended the development of the inudation canals in that province, not for protection against local famine, but for the sake of increasing the general wealth and food supply of the country. Much has been done in this direction during the last 18 years, and as will be presently shown much remains to be done. Without going into details it may be observed that the average area irrigated by irrigation works of all kinds in Sind during the five years ending 1885-1886 was 1,668,000 acres, and that in the five years ending 1895-1896 it amounted to 2,334,000 acres, which was exceeded by about 150,000 acres in 1896-1897. The works have proved very remunerative, and of late years the average return on the capital outlay has exceeded 6 per cent, while that on major and minor works of all kinds for which capital accounts have been kept amounted to 11.6 per cent in 1896-1897.

Recommendations of the Famine Commissioners relating to Madras Irrigation Works

The first measure recommended by the Famine Commissioners for Madras was the extension of the Godavari and Kistna irrigation systems, and the improvement of the Cauvery Work. The area irrigated by these systems appears to have increased by nearly 50 per cent since 1878-1879. The new works suggested by the Famine Commissioners were the Tungabhandra Canal in Bellary, the Kistnagiri reservoir in Salem, the Periyar project in Madura, the Rushikulya project in Ganjam, and the Sangam project in Nellore. We understand that the first of these has been considered, and that the cost was found prohibitive, though a scheme of some sort for extending irrigation in Bellary, where it is greatly needed, is still under investigation. I Salem, the Barur or Kistnagiri tank has been constructed at a capital cost of Rx 42,504 but has failed to fulfil the conditions of a productive public work, though the gross revenue has more than covered the working expenses. The Priyar project has been successfully completed at a cost of Rx 835,314, but new irrigation commenced only in 1896-1897, and the financial and irrigation prospects of the work are still uncertain. The Rushikulya project has been undertaken as a protective work and has already been referred to. The capital expenditure to the end of 1896-1897 amounted to Rx 447,853. It has not been quite completed, but it irrigated 63,327 acres during 1896-1897 and 36,000 acres in the previous year. On the Sangam project Rx 382,812 had been spent to the end of 1896-1897 and the works were nearly completed; the area irrigated in 1896-1897 amounted to 79,786 acres, and the net revenue exceeded the interest charges by Rx 1,296. Another project, the extension of the Kalniganyen channel estimated to cost Rx 8,710 and to irrigate 23,000 acres, has been sanctioned but has not yet been commenced.

The Kurnool-Cuddapah Canal

The Commissioners also recommended the transfer to the State of the works of the Madras Irrigation Company, or the Kurnool-Cuddapah Canal. The transfer has been effected, though it is a deal weight on the financial accounts of productive irrigation works, the net revenue averaging little more than Rx 1,000 a year, while the capital outlay to the end of 1896-97 amounted to Rx 2,171,349. The canal was however of great value during the late famine, as it irrigated 87,226 acres in the Kurnool and Cuddapah districts. In ordinary years it does not irrigate half this area.

Petty Irrigation Works in Madras

The Commission also referred to the necessity of some systematic scheme for the maintenance and improvement of the petty irrigation works, which have already been referred to as minor works for which neither capital nor revenue accounts are maintained. On the importance of these we have already dwelt. The matter appears to have received the attention it deserved. A regular establishment is maintained in connection with what is called the Tank Restoration scheme, and a systematic investigation is made in each district, the results of which are permanently recorded. Large sums of money are devoted annually for the repairs and improvements which have been recommended in the course of these investigations. We are not able to say whether there has been any considerable increase in the area irrigated from these works as a result of this organisation, but it should be at least serve to prevent retrogression, and it is clear that the importance of these petty works, which as has already been pointed out irrigate between them as much as all the other irrigation works in the presidency taken together, is fully recognized.

Future Extensions of Irrigation

We have now referred to the principal recommendations made by the Famine Commissioners for the extension of irrigation, and have shown that they have all been carried out, none of which can at present be confidently recommended, and the Ken Canal in Bundelkhand. We have also shown that has been done in the construction of protective irrigation works, and have described in general terms the expansion that has taken place in the irrigation from minor works. The successful financial results of the prosecution of productive works have also been indicated, and we now propose to consider the field that still remains open for works of this important class. The Famine Commissioners remarked that there were two kinds of irrigation works, those urgently necessary for famine protection in populated tracts, and those which might be designed for the extension of irrigation to areas lying waste and uncultivated, but which might be rendered culturable if water were conveyed to them. Their recommendations were chiefly confined to the former as of primary urgency, but in the case of the Punjab and Sind the Commissioners recognised and urged the importance of the latter. There is now, however, little scope for large works of the former kind, for as has been shown all that were recommended have been carried out, with the exception of the three already named, not one of which if eventually sanctioned is likely to be classed as a productive work. Nor are there many large areas of waste land that could be brought under cultivation by the construction of large irrigation works, except in the Punjab and Sind, and to a small extent in Upper Burma. We will therefore first consider what remains to be done in these three provinces.

Possible Extensions in the Punjab

In the Punjab three large projects may be proposed, the Jhelum, the Sind Sagar, and the Montgomery canals. The first of these only has been estimated in detail, and formally sanctioned. It will be shortly commenced and will take five or six years to complete, during which the other projects can be worked out in detail. It is estimated that the Jhelum canal will irrigate 424,000 acres annually, and that the capital cost will amount to Rx 1,228,000. The lands commanded lie in the Shahpur and Jhang districts.

The Sind Sagar scheme would irrigate the Sind Sagar doab, or the country lying between the Chenab and the Indus. The preliminary investigations which have made indicate that there are two alternative schemes to be considered. The larger and more comprehensive scheme is for a canal to take off from the left bank of the Indus at or near Mari, opposite Kalabagh, and to irrigate annually 1,750,000 acres. This would probably cost about Rx 6,000,000. The alternative is a smaller canal to take off from the Indus at a point nearly opposite. To Ahmad Sindi, a few miles north of Dera Ismail Khan, which would irrigate about 672,000 acres in the lower part of the doab, and would cost about Rx 2,000,000. No final decision as to which to these alternatives should be adopted can be arrived at until the schemes have been worked out in detail.

The third project is for a canal to take off from the eight bank of the Sutlej a short distance below the confluence of the Beas, for the irrigation of the lower portion of the doab lying between the Ravi and Sutlej in the Montgomery and Multan districts. This also has not yet been worked out in detail, but the later proposals contemplate the annual irrigation of about 600,000 acres, and the probable capital cost may be set down at Rx 2,500,000. The construction of headworks at the point named would also render it possible to construct a second canal on the left bank of the Sutlej which would irrigate part of the Ferozepore district and might be extended into Bahawalpur and possibly into Bikanir. It is, however, only necessary to mention this possibility, as the prosecution of the scheme would depend on the surplus supply which would be available after meeting the requirements of the proposed right bank canal, and on the cooperation of one or two native states.

Financial Prospects of the Punjab Projects

These three projects taken together would provide for an addition to the area irrigated by perennial canals in the Punjab of 2,774,000 or 1,696,000 acres, according to the scheme finally selected for the Sind Sagar Doab, at a roughly estimated capital expenditure of Rx 9,728,000 or Rx 5,728,000 respectively, or at the rate of about Rx 3.5 per acre. If we assume that the larger Sind Sagar project is eventually selected, the three canals together will command nearly 4 million acres of land which is now uncultivated and almost uninhabited, and will provide for the annual irrigation of from one-third to one-half of this area. Of these 4 million acres at least half are crown waste lands, the sale proceeds of which, after water has been conveyed to them, would certainly cover more than half the capital cost of the canals, though it is possible that in accordance with the policy adopted on the Chenab Canal, they would not be actually sold, but given out to colonists on long leases, in which case the rentals would be so much additional revenues due to the construction of the works. The remaining 2 million acres are said to have been alienated, though it is possible that arrangements may be made under which Government will resume possession of a portion of them by negotiation with the owners and in consideration of the advantages that will accrue by the construction of canals. This would facilitate their earlier colonisation, but even if no part can be resumed there is no doubt but that these lands also will in course of time be brought under cultivation, and assessed to land revenue. On one of these projects are all conditions so exceptionally favourable as on the Chenab Canal, upon which an ultimate return of not less than 16 per cent on the capital outlay is anticipated; but there is little doubt that they will prove financially remunerative.

Extension of Irrigation in Sind

In 1882 a committee was formed for considering various proposals that had been made for the extension of irrigation in Sind. The principal recommendations made were that two new canals, the Jamrao and Shikarpur, should be constructed, and that three existing canals, the Nasrat, Naulakhi and Dad, should be improved and extended. Estimates for all these works have since been sanctioned with the exception of the Shikarpur Canal, for which an estimate amounting to Rx 254,094, and providing for 123,000 acres of new irrigation, has been submitted by the Government of Bombay. This work is in abeyance pending the completion of the other projects, and some of the details were being reconsidered. The sanctioned estimate for the Jamrao Canal amounts to Rx 720,377 but a revised estimate has since been submitted for Rx 797,456 and the anticipated area of new irrigation is 260,000 acres. The Sanctioned estimates for the other three projects amount to Rx 545,132 and it is estimated that will result in an increase of 277,563 acres in the irrigated area. The total cost of the five projects may therefore be estimated at Rx 1,596,682 and the extension of irrigation at 660,563 acres. Of this expenditure it is estimated that Rx 536,132 or about one-third, will have been incurred by the end of 1898-99, leaving Rx 1,060,550 for the completion of these works. Other minor extensions and improvements of the irrigation works in Sind are in progress or in contemplation, but it is unnecessary to refer to them, and it is probable that other new works may hereafter be proposed. The figures given will, however, indicate that the extension of irrigation is receiving consideration, and that much yet remains to be done.

New Irrigation Works in Upper Burma

In Upper Burma three productive irrigation works have been proposed, the Mandalay the Shwebo and the Mon canals, which will serve the Mandalay, Shwebo and Minbu districts. Of these the first has been sanctioned and is in progress, the estimate amounting to Rx 323,280 of which Rx 5,967 only had been spent at the end of 1896-97. It is anticipated that it will irrigate 72,000 acres annually. Estimates for the other two works have also been prepared, though not yet finally sanctioned, and the probable total cost of the three projects may be taken at Rx 1,027,561, the area of annual irrigation anticipated being 262,000 acres. These works will all be situated within what is known as the "dry zone", the only part of Burma that is considered liable to famine. They will not afford complete protection to this zone, but its area will be considerably contracted by their construction, and a great deal of land at present uncltivated will be brought under cultivation. The resulting increase in foodgrains will reduce protanto, if not altogether, the importation of rice from Lower into Upper Burma which take place in years of drought, will tend to keep down local prices, and will set so much more grain free for exportation from Lower Burma to India, when the latter is affected by famine. A striking feature of the late famine was the large exportation of Burma rice to India, where it was carried into districts and provinces in which it was before quite unknown, and where its appearance tended very materially to inspire confidence, to moderate the rise of prices and to mitigate distress; so that it may safely be said that every extension of rice cultivation in Burma increases the resources on which reliance may be placed for meeting famine in other parts of India. It may be quoted that whatever may be said on general principles against the duty levied on export of rice in Burma, that duty does not apply to rice exported to India, and the system therefore has to some extent the useful effect of diverting the export of India in times of famine.

Active Prosecution of New Productive Irrigation Works Recommended

We have now mentioned the principal irrigation works of the productive class, which according to the information before us remain to be constructed in India. Others may no doubt be sooner or later proposed in these and other provinces, and much may perhaps also still be done in the extension of some of the existing irrigation systems, as improved control can be gained over the supply available, or a greater degree of economy attained in its distribution and utilisation. Apart however, from the capital expenditure that may be legitimately incurred on improvements of this kind, the works that we have mentioned may entail an outlay of about Rx 12,000,000 and will lead to an increase of 3,820,000 acres in the area annually irrigated from assured sources of supply. It has been shown that the average expenditure on productive irrigation works since 1879-1880, excluding the purchase of the Kurnool-Cuddapah canal, has amounted to Rx 540,000 per annum. In this rate is maintained in future, the programme would take a little more than 20 years to complete, assuming that nothing was spent from loan funds on the extension and improvement of existing works, though something will no doubt be required for this purpose. We do not know at what rate of progress these works could be most economically carried out. It is undoubtedly true that irrigation projects require far more time and care in elaboration than railways, and that progress in construction must necessarily be slower, especially when unpopulated tracts of country are to be served and the establishment of settlers provided for. But we recommend that these works should be prosecuted as energetically as may be consistent with true economy and ultimate efficiency, even though this may involve a higher annual expenditure in the future than in the past.

Reasons for the Policy Advocated

In thus following the Famine Commissioners in recommending an active policy in the extension of irrigation was recognise that in one respect the case is less urgent now than when they made their recommendations. Except in Upper Burma there are now no large works which are certain to be remunerative awaiting construction or completion within the districts which are most liable to famine, or in which the pressure of population is most severe. But all other reasons in favour of such a policy hold good, and they are strengthened by changes in conditions which have occurred since 1880, namely, the great extension of the railway system, the growth of the export trade in grain, and the still greater rate of increase in the population. In view of these conditions we have no hesitation in recommending the rapid extension of irrigation to remote districts in Sind and the Punjab, however free they may be from liability to famine, and however scanty their population, as the principal means for giving to the country an additional food supply which is beyond the risk of drought, and for increasing the proportion of secure to insecure cultivation. One of the most remarkable features in the recent famine was the uniform level of prices all over the country which is attributable to the ever-extending system of railways, and which, if it increased the area, greatly diminished the intensity of distress. By some it may be thought that the value of the latter result is much diminished by the effect of the former, but if new grain producing centres can be established in districts which are themselves remote from all danger of famine, the railways which transport their produce to the regions in which scarcity and distress prevail will be an unmixed blessing to all. The completion of the Southern Punjab and other railways will render the grain that may be grown in Sind or the Southern and Western Punjab almost as valuable a reserve for Northern, Central or Western India as if it had been grown in these regions. The demand for export, which is by some viewed with apprehension, will stimulate and encourage the cultivation in these newly irrigated tracts, but as that demand contracts or ceases on the rise of prices in India due to the approach of famine the produce will be available for consumption within the country. Moreover, as the amount of exports depends on other considerations than the quantity of grain in the country, much of this new produce will even in ordinary years remain and form a permanent addition to the food supply.

Financial Results that may be Anticipated

The new works will therefore tend to reduce the pressure of future famines, and to counteract in some degree the effect of the growth of population, while at the same time adding in ordinary years to the general wealth of the country. Their construction may also be recommended as a financial investment, and as strengthening the financial resources of the State. We have already shown that the surplus revenue realised by productive irrigation works, after all interest charges at 4 per cent had been paid, amounted in 1896-1897 to Rx 809,173. This was higher than usual on account of drought, but the actual surplus for 1897-1898 was even higher, and when the stimulus afforded by famine has passed away the normal surplus will probably not be less than Rx 700,000 or nearly half the amount of the famine grant. If the new works are as profitable, taken as a whole, or those already constructed, a surplus revenue of one crore may be eventually anticipated, or in other words the net direct financial profit on productive irrigation will be sufficient to meet the two-thirds of the whole estimated cost of famine. The value of these works, and in a less degree of protective and minor irrigation works, in strengthening the financial position of the country may, however, be shown in another way. During the years 1896-1897 and 1897-1898 famine necessitated remissions of land revenue to the amount of Rx 1,448,000 and there was great loss of revenue under other heads directly or indirectly attributable to famine. The remissions of land revenue and the whole cost of relief would of course have been infinitely greater if these works had not been constructed; but apart from the value of the works in this respect, the revenue earned by irrigation works of all kinds in these two years showed an excess over the normal of Rx 981,600 which has been directly attributed to famine. It is therefore a special recommendation of these works that while almost all other sources of revenue are certain to be largely reduced in years of famine, irrigation revenue may be expected to increase, while it will be short only in years of abundant and favourable rainfall, when there is an expansion of other sources of revenue consequent on agricultural prosperity.

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New Protective Irrigation Works

We have next to consider the question of protective irrigation works. It has already been shown that with the exception of Upper Burma there is no longer any field for productive works in those districts and parts of the country which are most exposed to famine, but we do not recommend that in such districts new irrigation works should not be undertaken because they are not likely to prove financially remunerative. We have elsewhere recommended that a much larger share of that portion of the famine grant which is devoted to famine protective works should be allotted to protective irrigation works, as long as suitable works can be proposed. But suitable we do not mean works that are likely to be remunerative within a reasonable time, for we think that the cost of such works should not be charged against the grant, but we mean works the cost of which will not, in the judgment of the sanctioning authority, be inordinately high with reference to the degree and character of the famine protection provided, and the direct return, if any, that may be anticipated on their cost in a series of years. We think that as many works as possible of this class should be sanctioned in districts which experience has shown to be very liable to drought, if there is a reasonable hope that they will be in the long run directly pay their working expenses. We are not in a position to specify particular works which will fulfil all the required conditions, but we think that such works as the Ken Canal in Bundelkhand or the Tribeni Canal in Champaran should certainly be constructed as protective works if it can be shown that they may be relied on to afford such protection in seasons of drought as will justify the expenditure proposed, or rather as much of it may be uncovered by any net revenue that may be anticipated in a series of years. Funds may also with advantage be supplied from the grant for completing irrigation works which may have been undertaken during famine as a means of providing employment for relief labourers, and especially for the construction of masonry or other supplementary works which could not be carried out by famine labour, but which are necessary before the works can be effectively utilised. Lastly, we think that allotments may with advantage be made from the grant for the survey and investigation of irrigation schemes in districts which are liable to famine, so that full programmes of such works may be maintained with a view to their construction in order to urgency out of the famine grant, or to their being started as relief works when distress actually occurs. We do not, however, recommend that protective works should be recklessly constructed without regard to what their real value will be in seasons of drought. We recognise that in the case of many projects that may be brought forward their construction may prove, from the purely financial point of view, a less effective insurance against famine than the application of the amount of their estimated cost to the reduction or avoidance of debt; but we agree with the Famine Commissioners that within certain obvious prudential limits it is but right that some portion of the profits realised from irrigation works in provinces in which all conditions are favourable may fairly be applied to the construction of others in less favoured tracts, from which no direct financial return can be expected, but which will at least afford some protection against drought and famine, and we believe that effect can be best given to this policy through the *modus operandi* established in connection with the Famine Insurance Grant. We need but indicate the caution that should be exercised in sanctioning such projects; some works will no doubt be constructed which will not fulfil the anticipations of the designers, but it may be hoped that the results attained on others will surpass them, and as more and more experience is gained a system of protective irrigation works will be gradually constructed in the districts in which they are most needed which will on the whole justify by its efficiency in seasons of drought the whole of the outlay incurred.

Water-supply in State Grazing Grounds

In connection with the construction of protective irrigation works two points have arisen which seem to us to deserve careful consideration. It has been brought to our notice that in some districts where there are State forests and grazing grounds, these tracts become practically waterless in the dry season, and their utility as grazing grounds in famine time is thereby greatly diminished. During the late famine the loss of cattle in some provinces was very great, and there is reason to believe that owing to the absence of water the grazing grounds in the State forests could not be utilized to the extent they otherwise might have been. The preservation of cattle in time of famine is a matter of no small importance to the agricultural community, and the question arises whether the sufferings of both men and cattle due to want of drinking water is seasons of drought might not be greatly alleviated by the construction beforehand of wells or reservoirs in tracts where it can be shown with tolerable certainty that their presence will be serviceable. The question is a wide one and would require very careful consideration before definite action could be taken. But, having regard to the magnitude of the interests at stake and to the fact that the value of Government forests would be greatly enhanced if a reliable water-supply could be ensured, we think the subject is one deserving of full and careful inquiry. We are disposed to suggest that wherever there are considerable tracts of country, where in seasons of drought the supply of fodder is liable to fail and a greatly mortality among cattle may be anticipated, and when within a reasonable distance there are government forests of grazing grounds to which the cattle might be driven for protection, steps should be taken to ascertain whether there is a possibility of supplying those grazing grounds with thanks, reservoirs or wells capable of affording a sufficient and reliable supply of drinking water for man and beast. If after careful investigation by the Forest and Public Works officers it could be shown in any case that adequate protection could be afforded at a reasonable cost to a large number of valuable cattle that would otherwise be lost, we think it might then be worth while to provide that protection. The necessary funds, if not available from other sources, might legitimately be provided from the Famine Insurance grant under the head "Protective Works".

Advances for Sinking Wells

The second point we refer to is in connection with advances made to landowners and cultivators for the sinking of wells. Whatever field there may be for many years to come for the construction of protective irrigation works of the ordinary kind, that is canals or storage works, there are probably more tracts liable to periodical drought in which the desired protection may be afforded with greater certainty or at less financial risk by the construction of wells, by means of State advances which would be only partially recoverable, the irrecoverable portion of the advance being a final charge against the Famine Insurance grant. We have not attempted to formulate any scheme under which the money would be applied, but we think that there are some tracts in which State assistance may be given more effectively in this form than in the construction of ordinary irrigation works, and for which a satisfactory scheme of this kind might possibly be devised. We have referred elsewhere in our report to the fact that in Bombay large sums of money were wasted by all small landholders in attempts to sink wells in localities where there was no certainty of finding - water, and it is open to consideration whether when wells have to be sunk through rock with uncertain results, it might not be worth while for the State to share part of the cost in view of the protection afforded if water is eventually found. It is also open to consideration whether the State might not bear the cost of scientific aid in the shape of boring operations to ascertain whether or not a supply of water will be forthcoming if the well is sunk. We have been informed that in the North-Western Provinces operations of this nature have been conducted in a more or less systematised method and that the result was not been unsuccessful.

Extensions of Minor Works

As regards minor works there is little to be said. We have already shown the great usefulness and general remunerativeness of these works, and if we refrain from recommending a larger expenditure on them, it is because we recognise that this can only be arranged for by diverting a larger portion of the general revenues from other heads of expenditure which may not bear contraction. The only suggestion we can make is that new projects which are likely to fulfil the conditions of protective irrigation works, and which are of sufficient importance to justify the opening of capital and revenue accounts, that is, which are estimated to cost more than Rx 5,000 should be classed as protective works and constructed out of borrowed money, when funds cannot otherwise be found for them out of the ordinary grant for minor works. This would render it possible to construct such works earlier than would otherwise be the case, or would set free more of the ordinary grant for the improvement of existing minor works or the construction of new ones which could not be conveniently classed as productive. There is no minimum limit to the cost of works classed as productive but the cost of the smallest work hitherto included in that class has not been less than Rx 37,000. There must be many small and useful irrigation projects which are certain to fulfil the conditions prescribed for productive works, and the multiplication of such works would be facilitated if they could be so classed and constructed from borrowed money, the amount available from the ordinary grant for minor works, after providing for the maintenance of those works, being utilized for extending or improving them, or for the construction of new minor works.

Section III

The Grain Trade, Food Supply, and the Power of Resisting Famine

Opinion of the Famine Commissioners with regard to Government Intervention in the matter of the Food Supply

In connection with the question of the food supply of India, the Famine Commissioners in Part 1 of their report discussed the subject of the direct intervention of Government to control or aid the action of private trade in the supply of food in time of scarcity. At the time the Commissioners wrote, opinion had steadily settled down to the conclusion that, as a rule, such intervention should be avoided, but that exceptional circumstances might justify or even require it, and their own views were expressed in the following terms :—

> "We have no doubt that the true principle for the Government to adopt as its general rule of conduct in this matter is to leave the business of the supply and distribution of food to private trade, taking care that every possible facility is given for its free action, and that all obstacles, material or fiscal, are, as far as practicable, removed."

In giving expression in this opinion, the Commissioners took care to point out that a resolution to rely entirely on the ordinary operations of trade to meet the wants of the country in time of famine must unquestionably rest not only on the expected activity of the traders, but also on the probability of the requisite supplies of food being forthcoming at the critical time. After a prolonged inquiry into the out turn and consumption of food in British India and the ordinary surplus available for storage, export, or luxurious use, they arrived at the conclusion that for the time being and until the then estimated yearly surplus was absorbed by the increase of population which might reasonably be anticipated, there was no doubt that the surplus produce of India, taken as a whole, was sufficient to furnish the means of meeting the demands of any part of the country likely to suffer from famine at any one time. As regards the exceptional cases in which the Government might find it necessary to intervene, in departure from the general principle of abstention from interference with private trade, the Commissioners in paragraph 159 enumerated four instances in which this might occur. These were—

(1) When it is necessary for the Government to provide food for its own relief works and gratuitous distribution in localities where no arrangements for the supply of food exist;
(2) When a stimulus is required to trade where it is sluggish, as, for example, in districts in which communications or the means of transport are defective, or to which access by railways or by water cannot be secured at all seasons;
(3) When in purely agricultural tracts, where wages are paid in grain and not in money and the local demand is met not by imports from distant marts but by small purchases from the stores of the agriculturists, the agriculturists refuse to sell and local traders are afraid to import; and
(4) When a combination takes place among local dealers to refuse to sell or only to sell at prices unduly raised above the rates of neighbouring markets.

Policy Laid Down by the Famine Commissioners followed during the Recent Famine

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During the late famine, the Government of India in its letter to the Government of Bengal of January 4th, 1897 declared its intention of adhering to the principles laid down by the Famine Commissioners, and of rigidly abstaining from intervention with trade save in the very exceptional circumstances in which such intervention might be absolutely necessary. With the object of encouraging trade, the Government of India placed at the disposal of the public freely, fully and promptly all the information is possessed, so as to assist the mercantile community as far as possible in verifying the facts on which their action must depend. Secondly, it guaranteed that in the distressed tracts the demand for food should be an effective demand, that is to say, that those who required food should have enough money to pay for it, the guarantee being provided by Government undertaking to find work for all who were in danger of starvation, and paying them at rates sufficient to buy a subsistence ration, whatever the local current price of food might be. Thirdly, it took care that every possible facility was given for the free action of private trade, and that all obstacles, material or fiscal, were as far as practicable removed. There is a general consensus of opinion among the provincial Governments that this policy was right. It has been computed that in 1896-1897 the food-out turn of British India (excluding Burma) was about one-third below that of ordinary years, representing a deficiency of some 18 or 19 million tonnes. It cannot be doubted that the out turn of the year was much below the requirements of the population, while in some tracts there was virtually no crop at all. Yet, with the exception of about 600,000 tonnes of Burma rice, there was but little import of food grains from abroad, and there has been no absolute dearth of food. The activity of private trade has been sufficient to distribute existing stocks so as to make good the deficiency in the out turn of the affected tracts, and food has always been purchasable through at high, and in some remote places excessively high, prices. The exceptional cases in which the intervention of Government was thought necessary were very few indeed, and were all of the nature contemplated by the Famine Commissioners. Instances of these are the Palamau district in Bengal, the Bhadra-Chalam taluk of the Godavari district in Madras, the Shetphal relief work in the Poona district in Bombay, and in the Central Provinces the Mandla and Balaghat districts, the Sironcha tahsil of the Chanda district and some relief camps and relief centres in other districts. In the North-Western Provinces it is stated that, "in one or two instances in isolated tracts where there was some doubt whether the resources of the petty village traders would be equal to the task of importing the grain required for consumption on relief works and in remote villages, discretion was given to local officers to assist such traders, if necessary, with money advances; but this discretion was little used."

Enquiries made do not Affect the Conclusion Arrived at by the Commission of 1880

In the series of questions we drew up for the guidance of witnesses, we included some questions relating to food-stocks and prices and to the grain trade, and we took some interesting evidence on these subjects, chiefly at Calcutta where a number of merchants and businessmen appeared before us. After a careful examination of the evidence we took and of the general considerations involved, the recommendations submitted by the Famine Commissioners in 1880, which are admirably stated in their report, seem to us to be still completely applicable, and we can suggest no additions, or qualifications. So far as the past is concerned, the policy of almost entire abstention pursued in the late famine is justified by the substantial degree of success attained. Private trade, we find, proved itself able to regulate the supply of food throughout India. It is true that the conditions were such as not to render necessary the import of food by sea except from Burma, but had such import been required and had there been an absolute dearth of food in India, we see no reason to believe that private trade would not have been able and willing to import from foreign countries, such as Siam, Japan and America. Since 1880 the great extension of the railway system and the lowering of sea freights and the growth of a considerable export trade (not confined to wheat and rice) have very largely equalised grain prices in all parts of India, and the same tendency is at work all over the civilised world. It is to this cause and to the fall in the value of the rupee, now checked by the closing of the mints, that the rise in average Indian grain prices, which seems to be a permanent one, appears to be due. Whether or not it is also in part due to an increase in consumption in India, greater than the increase in production, is a factor of the greatest importance as regards the future.

Estimated Annual Foodgrain Production and Surplus

From the figures given in the table in paragraphs 156 of their report, the Famine Commission after careful inquiry came to the conclusion that the annual food grain production in British India (excluding Burma, but including Mysore which was then under British rule) was 51,530,000 tonnes, that its requirements were satisfied by 47,165,000 tonnes, and that a surplus of 5,165,000 tons (including a surplus of 800,000 tonnes in Burma) was available for export or for storage. In his Narrative of the Famine in India our colleague, Mr. Holderness, has carried on the calculation on the data employed by the Famine Commission, and estimates that since they wrote the population of the same area has risen by 17 per cent, or from 181 millions to 212 millions, and the food requirements to 54,308,000 tonnes. During the same period he estimates that the area under foodgrains has risen by only 8 per cent, or from 166½ millions of acred 185 millions, the out turn of which would be 56,000,000 tonnes. On these figures a surplus of only 1,700,000 tonnes would result in place of the surplus of 5,165,000 tonnes estimated by the Commissioners. Some of the witnesses engaged in the export trade, whom we questioned on the point, were of opinion that the result is much below the real average surplus of the present time. The figures in the following table, which is on the model of that given by the Famine Commissioners, have been furnished to us by the local Government or Administration of each province in British India.

These figures are only rough approximations based on such data as are available regarding the average acreage under food crops and the average yield per acre. So far as they are capable of comparison, they differ widely from those put forward by the Famine Commissioners in 1880, and it will be seen that they result in a normal surplus of 9½ million tonnes against the 5 million tonnes shown in the report of the Famine Commission. This increase is mainly due to much higher estimates of surplus for Bengal and Burma. Owing to the imperfect machinery available for their collection, the Bengal returns are particularly unreliable. For some other provinces the estimates differ very largely in the direction of excesses or deficiency from those taken by the Famine Commissioners. On the whole we are disposed to think that in the figures supplied to us by local Government the normal surplus in most cases is placed too high, as the exports from India and Burma by sea for a series of years and the tendency of prices to rise indicate the existence of a much smaller margin. If there is one part of India in which the production of food might be expected to have increased more rapidly than the demands of the population during the last 20 years, it is the province of the Punjab. Yet the figures for the Punjab indicate a surplus of only 205,072 tonnes as compared with 620,000 tonnes shown by the Famine Commissioners. The Punjab Government has informed us that the difference is due to various improved methods of computation, as well as to the

Province	Population	Food crop area	Outturn of food	Area under non-food crops	Ordinary Consumption				Total	Total Surplus
					Food	Seed	Wastage	Cattle food		
Punjab	21,313,172	19,184,655	5,370,518	3,701,147	4,306,164	375,936	241,673	241,673	5,165,446	205,072
North-Western Provinces and Oudh	46,905,085	35,911,680	12,250,289	5,178,846	9773,210	1,081,674	691,910	500,00	12,046,794	203,494
Bengal	74,200,000	50,596,000	24,207,000	9,700,000	17,265,000	300,000	1,100,000	200,000	21,101,000	3,306,000
Central Provinces	9,800,000	14,000,000	3,000,000	3,250,000	1,750,000	30,000	175,000	240,000	2,465,000	535,000
Berar	2,897,040	3,896,302	1,226,965	2,767,994	500,000	238,00	30,000	100,000	660,000	566,965
Bombay (Including Sind)	18,035,000	23,223,000	6,092,000	6,078,000	4,028,000	363,573	304,000	415,000	5,985,000	1,107,000
Madras*	28,415,000	21,696,000	8,043,000	5,746,000	5,771,000	117,700	386,457	403,970	6,925,200	1,117,800
Burma, Lower	4,408,466	5,493,190	3,766,500	417,294	1,413,000	44,200	1,400	70,600	1,602,700	2,163,800
Burma, Upper	3,362,428	2,063,348	1,414,800	599,479	1,008,700	129,500	500	26,500	1,079,900	334,900
Assam	5,891,000	4,051,000	2,402,900	1,102,000	2,165,800	4,590	120,100	—	2,415,400	– 12,500
Coorg	173,055	114,248	51,000	93,000	37,598	—	2,550	67	44,805	6,195
Ajmer-Marwar**	226,035	192,000	45,000	41,800	40,000	2,000	1,100	1,500	44,600	400
Total	215,627,181	180,421,323	68,096,972	38,675,560	48,058,472	4,223,173	3,054,690	3,199,310	58,535,845	9,534,127

* The Madras figures refer only to *ryotwari* areas for which returns of cropped areas are available, and exclude zamindari and agency tracts for which no returns are available and which comprise about a third of the area of the presidency.

** The figures for Ajmer-Marwar exclude those for the *lastimrari* Estates.

large increase of population. But as during the five years ending 1896-1897 the exports, according to the trade returns, averaged 482,000 tonnes, we are forced to the conclusion that the Punjab surplus estimate is much too low. It is admitted that the fact that exports from certain native states are included in the trade returns cannot suffice to explain the difference. On the other hand, the surplus of 3,306,000 tonnes returned for the province of Bengal appears to us to be greatly in excess of the reality, and the local Government takes the same view. The average annual export from Bengal during the five years preceding the famine was only 305,000 tonnes, or one-tenth only of the quantity estimated from other data to be the surplus. The Bombay return also appears to be far too high, as the export from the presidency never attains high dimensions and prices of foodgrains have risen of recent years. These two facts are incompatible with the existence of so large an annual surplus as is returned. For the same reason the Burma annual surplus has been pitched to high. It is only in a very good year indeed that the surplus rice crop of Burma available for export is put by the trade at 1,600,000 tonnes of cleaned rice.

Having regard to the degree to which the increase of population appears to have surpassed the increase of food-crop area, we are inclined to the inclined to the belief that whatever may have been the normal annual surplus of foodgains in 1880, the present surplus cannot be greater than that figure. But that a substantial surplus still exists in ordinary years there can, in our opinion, be no doubt. We think that the surplus produce of India, taken as a whole, still furnished ample means of meeting the demands of any part of the country likely to suffer from famine at any one time, supposing such famine to be not greater in extent and duration than any hitherto experienced. If proof is wanted, it is found in the fact that during the late famine, which affected more or less very province in India, except Burma, and is estimated to have lowered the average yield of those provinces by one-third, or some 18 million tonnes of food grains, the stocks at the end do not seem to have been close on exhaustion, though the only import from outside was some 600,000 tonnes from Burma. No doubt the high prices led to great and often painful economy of consumption, but nevertheless the result indicates considerable ordinary surplus and accumulated stocks.

High Prices of Foodgrains Throughout India during the Recent Famine

The great and sudden rise in the price of all foodgrains that occurred in the later months of 1896, the lengthened period for which the high pitch of prices reached was maintained, and the remarkable tendency to a common level of prices throughout India during the famine, are matters which have been attracted considerable notice. The question has been very fully discussed by Mr. Holderness in his Narrative of the famine, and among our appendices will be found a table showing month by month from June 1896 to April 1898 average retail prices in certain markets of the foodgrains most in use in each tract, and the corresponding annual average price for the three preceding years. We do not doubt that the great and sudden rise in prices at the end of 1896 was a reasonable one, to the extent to which reason can be held to govern sudden fluctuations of the kind. There seem to have been considerable stocks in almost all provinces, but no large surplus anywhere except in Burma. The chance of another year of drought had to be kept in mind, and the grain-dealers well known that if India had to go abroad for her supplies she could only buy at prices which to Indians would be famine prices. Possibly in Madras and Bombay the rise may have been intensified to a small extent by the fact to which some witnesses allude that there was a prophecy of a three years famine. This prophecy seems to have affected to some extent the peasants, who husbanded their stocks instead of throwing them on the market; the grain-dealers seem as a rule to have been sceptical as to the continuance of high prices, and to have been ready enough to sell at them, or buy at them, and sell again for small assured profits. Throughout India generally there was activity in the grain trade, but no great tension or excitement. The operations, as a whole, were not on a bold or large scale. The uniformity of prices prevented much speculation, or much movement of grain on a large scale. The rather remarkable absence of speculative dealings on a large scale may possibly have been also due to the well-known tightness in the money market, and to the doubt already alluded to as to the continuance of high prices. There is no evidence of any general practice of combination among grain-dealers to keep up prices, and the evidence of expert witnesses before us was to the effect that this was now as impossible in India as in England. In a few small centres of no importance, where the grain-dealers thought they had a chance of successfully combining to keep them up, there is evidence that naturally enough they did on occasions combine, but the success of such combinations was only slight and temporary and easy to defeat. Where prices were for any length of time exceptionally high, it was due to exhaustion of local stocks and difficulties of carriage. Elsewhere the difference in price above the common level was seldom more than the cost of carriage from places where grain was cheaper, plus a small rate of profit. So far as the evidence before us shows, no large fortunes were made or great losses incurred in the grain trade.

Tendency to Equalisation of Prices Throughout India due to Railway Extensions

It is clear that the very marked tendency to equalisation of prices throughout India is due to the great extension of railways and to the opening up of large tracts of country formerly provided with inadequate means of communication. On almost all railways in India the sanctioned rates for grain freight vary from ¼ to $^1/_{10}$ *pie* per *maund* per mile, though on two lines the permissible maximum is 0.44 *pie* per *maund* per mile. Within these limits, the actual charges are at the discretion of the railway administration, and generally vary according to distance. We have ascertained that during the famine special rates for grain freight were sanctioned on all lines, the percentage of reduction varying considerably on different lines and on different lengths of the same line. The maximum percentage of reduction appears to have been 60 per cent. From the information before us as to the rates actually charged during the late famine, we infer that in future famines the rate for the carriage of grain by rail may be estimated at about 1¼ *annas* per *maund* per 100 miles for distances not exceeding 500 miles, at 1 *anna* per *maund* for distances exceeding 1,000 miles, and at about $1^1/_8$ *annas* for distances between 500 and 1,000 miles. In 1880, according to the Famine Commissioners, the charge for transport between the most distant parts of India connected by rail was about one *anna* per *seer*, and grain could be bought costing 24 seers per rupee in Northern India and sold with fair profit in Southern India at 8 *seers* per rupee. At the present time grain would be carried 1,000 miles for a little over 10 *annas* per *maund* of 40 *seers*, and wheat selling in the Punjab at 12 *seers* per rupee could, if one the line of rail, be placed 1,000 miles off and sold at 10 *seers* per rupee.

The Import and Export Trade of India

In our appendices we give a statement showing imports and exports of each kind of grain into and from British India by sea from and to other countries in each of the twelve months October to September 1891-1892 to 1896-1897, and during the official year ending 31st March 1897-1898. The figures include the trade between Burma and foreign countries, but not between Burma and the rest of India. The effects of the famine on the export trade have been noticed by the Director General of Statistics in his Review of the Trade of India. In 1896-1897 (October to September) the imports of grain amounted to 95,560 tonnes as compared with 12,313 tonnes in the preceding year, while the exports fell to 1,278,364 tonnes from 1,952,145 tonnes in 1895-1896 and 2,425,643 tonnes in 1894-1895. The revival of the export trade as soon as the famine terminated is indicated by the figures for the official year 1897-1898. Although it is probable that the revival of exports may have operated to maintain prices at a higher level than would otherwise have been the case, we cannot but regard the circumstance as indicative of the existence of greater accumulations of grain than was ordinarily supposed. Among certain classes in India, who do not directly profit by it, there no doubt exists a feeling of bitterness against the export trade. It no doubt tends to prevent prices ever falling very low, but on the whole we have no reason to believe that the trade is otherwise than beneficial to the country. Higher and steadier prices must be good for the landholders and tenants, and ought not to be otherwise than good in the end for the labourers, if their wages rise proportionately, which it is to be hoped they must generally do eventually. The export is so insignificant compared with the production as not to constitute an appreciable drain on the country, and by the stimulus it affords to increasing the area and intensity of cultivation it must, we think, operate to increase the reserve of food in times of scarcity.

Resources and Resisting Power of the People in Times of Famine

A question that naturally suggests itself is whether during the recent famine the people have shown increased resources and more resisting power than in previous famines of like severity, and the matter is one that has not escaped the observation of the various local Government and their officers who were actively concerned in the administration of relief operations. In Bengal the local Government is very decidely of opinion that since the famine of 1873-1874 the powers of people to resist the effects of calamity of season have largely increased. This advance in material prosperity is held to embrace even the congested and depressed districts of Behar, but in respect of these districts it is stated that "in Behar the wage of an agricultural labourers, which term includes petty agriculturists who supplement profits of their small holdings by working for wages, is in ordinary times as low as form 1½ to 2 *annas* a day"; that "this wage is barely sufficient to supply food to the labourer and his family when food grains sell at ordinary prices"; and that "this class has in no way benefitted by that rise in prices of agricultural produce which has tended to alleviate the condition of agriculturists". There is ample evidence, we think, that in Bengal generally, excepting certain unfortunate tracts like Nuddea, there has been a marked advance in the material prosperity of the people since the great famine of 1873-1874. But as regards the labouring classes in Behar, we are disposed to accept what seems to be the general sense of the Commissioners and Collectors and what indeed is said by the local Government itself regarding them. We doubt whether there has been much improvement in the economic condition of the poorer agriculturists or the labouring population in Behar, or whether they now command greater resources and show more resisting power than in previous famines. We observe, however, that improved communications enable the best of the labouring class to migrate temporarily to other parts of the province and there find employment at seasons when they cannot get it at home, and in this respect it may be said that their condition has improved.

In Madras the condition of the Deccan districts is an interesting and perplexing problem. The economic condition of the population of that region compares unfavourably with that of the population in other parts of the Madras presidency, and this is a natural consequence of the comparative poverty of the soil and the liability of the Deccan to drought. The view taken by the Madras Famine Commissioner in his final report of the famine seems to be that the condition of the Deccan raiyat has not improved of recent years. How far this is the case, it is difficult to say. For some years prior to 1877-1878 the Deccan raiyats had been gradually improving in economic condition. Then came the great famine of those years which carried off a considerable proportion of the population and left the remainder in a more impoverished condition than before. To make good the round lost in the famine was a slow process, but in course of time there ensured what for the Deccan may be considered a succession of good seasons, and a slow improvement in the condition of the small raiyats became apparent. It was noticed by competent observers that though the country was still in a low economic condition and subject as before the frequent droughts, the condition of the mass of the raiyats was steadily if slowly improving. Lands which formerly had little or no value gradually acquired a value, and the raiyats were able to obtain advances on them on easier terms. The extension of communications operated to mitigate the violent fluctuations of prices and so rendered more secure the position of the cultivator. This gradual improvement was checked by the severe scarcity of 1891-1892, and before they had time to recover fully from that check the people have again been thrown back by the greater calamity of 1896-1897. That the mass of the Madras Deccan raiyats are still very poor and without resources we have no doubt, and it would probably be unsafe to infer that their power of resistance of famine has increased during the last 20 years. On the other hand, we are not able to perceive any symptoms of general decline.

With regard to the Bombay Deccan and Southern Maratta country, it is the opinion of the Bombay Government that the occurrence of the late famine has afforded indications of a remarkable improvement in the general condition of the cultivating classes and in their power of resistance. We are not really capable of criticising this opinion, but it seems to us to be rather too sanguine a view of the situation.

In the North-Western Provinces the Lieutenant-Governor draws the general conclusion that the cultivating classes, whether tenants or proprietors, have displayed in the recent famine a command of resources either in the shape of capital or credit and a power of resistance which has not been paralleled in any previous period of scarcity; but that this improvement has not been materially shared by the labouring classes. In this expression of opinion we generally concur, but we are disposed to doubt whether it should not be qualified as regards the small proprietors and cultivators of the country south of the Jamuna generally, and in particular of that part of it which includes the Bundelkhand districts and South Allahabad. We see no sign of improvement in that tract, particularly in the districts named. Nor do we see any such sign in the case of the small proprietors of the Hardoi district.

In the Punjab a larger proportion of the cultivation is now protected by irrigation than formerly, and there has been an enormous addition to the credit of the agricultural community resulting from the marked rise in the value of agricultural land that has taken place within the last 20 or 30 years. The proprietors, who farm most of the land themselves, have profited more or less by the higher prices of foodgrains which have prevailed, and the rise in the value of their land has enlarged their credit. But in the more congested districts, where holdings have been much sub-divided, the small owners are frequently very poor and greatly indebt. The tenant class has no doubt also benefited to some extent from the rise of prices, but they are almost entirely tenants at will, and have little credit and very small resources. The labouring classes in this province are generally well off, and frequently able to save from their earnings.

The general conclusion drawn by the Chief Commissioner of the Central Provinces is that the resisting power of the people has very markedly increased during the past generation, and that the destitution following on severe agricultural disaster is limited to certain classes of the community much more narrowly than before. The cultivators, it is said, have generally with stood the famine with surprising firmness, and their resisting power in the more fertile parts of the province was independent of the relief offered to them; and in the province, as a whole, there has been surprisingly little deterioration of a lasting character. It is open to question whether this view is not much too sanguine. There is evidence that many of the old *malguzars* and of the old tenants have falled hopelessly into debt, while others are just able to maintain their position in years of ordinary prosperity. The labouring classes we believe live in tolerable comfort in ordinary years, but they save nothing for bad years, and there are no signs of increased powers of resistance on their part.

General Conclusion Arrived at by the Commission

The general conclusions we are disposed to draw are that it may be said of India as a whole that of late years owing to high prices there has been a considerable increase in the incomes of the landholding and cultivating classes, and that their standard of comfort and of expenditure has also risen. With a rise in the transfer value of their tenures, their credit has also expanded. During the recent famine these classes, as a rule, have therefore shown greater power of resisting famine, either by drawing on savings, or by borrowing, or by reduction of expenditure, than in any previous period of scarcity of like severity. Whether it can be safely said that they have much improved in thrift, that is in the accumulation of capital, seems open to doubt. There is some evidence to the effect that the export trade and the improvement of communications have tended to diminish the custom of storing grain, as a protection against failure of harvest, which used to be general among the agricultural classes. The skilled artisans, excepting the weavers, have also greatly improved their incomes and their style of living and very few of them required relief. The commercial classes, whose numbers are relatively small, are not generally injuriously affected by famines of short duration. The poorer professional classes suffered severely from rise of prices, but do not come on famine relief. Beyond these classes there always has existed, and there still does exist, a lower section of the community living a hand to mouth existence, with a low-standard of comfort, and abnormally sensitive to the effects of inferior harvests and calamities of season. This section is very large, and includes the great class of day labourers and the least skilled of the artisans. So far as we have been able to form a general opinion upon a difficult question from the evidence we have heard and the statistics placed before us, the wages of these people have not risen in the last twenty years in the proportion to the rise in prices of their necessaries of life. The experience of the recent famine fails to suggest that this section of the community has shown any larger command of resources or any increased power of resistance. Far from contracting, it seems to be gradually widening, particularly in the more congested districts. Its sensitiveness or liability to succumb, instead of diminishing, is possibly becoming more accentuated, as larger and more powerful forces supervene and make their effects felt where formerly the result was determined by purely local conditions. We may take this opportunity of remarking that the evidence given before us by many witnesses proved that in times of scarcity and famine in India the rise in price of food is not accompanied by a rise in the wages of labour; on the contrary, owing to competition for the little employment available when agricultural employment falls off the rate of wages offered and accepted is frequently below the ordinary or customary rate. Such wages in times of famine prices are not subsistence wages for a labourer with dependants to support. This explains and justifies the practice which able-bodied labourers often adopt of taking what private employment they can get at their homes or elsewhere, and sending their wives and children to the relief works. The fact also indicates a practical difficulty in the way of the working of a principle which has been laid down by high authority. That principle was that remuneration on relief works should be always fixed so as not to attract labour for which there is existing employment elsewhere. But if the wage for such employment is not a living wage for the ordinary labourer with a family, the wage the family can earn on relief works must necessarily be higher.

Section IV

Subjects of Native State

The area affected in native states

In the territories of native states the area affected by famine or scarcity in 1896-1897 was returned at 82,000 square miles with a population of 7 millions. It comprised the Bikaner, Bhuratpur and Dholepur States in Rajputana; and in Central India the northern districts of the Gwalior State and virtually all the States (of which Rewa is the largest) forming the Baghelkhand and Bundelkhand Agencies, and lying between British Bundelkhand on the north and the Central Provinces on the south. The southern States of Rajputana, the States of Indore and Bhopal, and the Southern districts of Gwalior in Central India were not sufficiently affected to require relief operations, although they also experienced short harvests. In the Deccan and south-western districts of the Hyderabad State, which lie in the angle between the distressed districts of Kurnool and Bellary in the Madras presidency and the distressed districts of Dharwar and Bijapur in the Bombay presidency, were affected in much the same degree as the adjoining British districts. In Bundelkhand and Banghelkhand intense distress prevailed as in the adjoining districts of British Bundelkhand in the North-Western Provinces. In Gwalior and Bhuratpur and in the affected parts of Rajputana distress, though severe, as at no time nearly so as in Bundelkhand. In Hyderabad the affected districts owing to preceding good harvests entered upon the year of drought with large reserves of foodgrain in the hands of the cultivators. An account of the measures of relief adopted by the rulers of the states concerned has been given in the Narrative of the Famine in India in 1896-1897 by our colleague, Mr. Holderness. We observe it is stated there (paragraph 19) that the measures adopted were not always sufficient to meet the emergency, and in paragraph 94 of the Narrative allusion is made to the high mortality which it is conjectured must have occurred in the affected parts of Central India.

The Instructions to the Commission do not extend to Native States

Our instructions did not expressly apply to native states, and for several reasons we thought it impossible to interpret their extent in that way. To do so, it would have been necessary for us to carefully examine and compare the several methods of relief adopted in each state, to inquire into the degree of success that attended them, and to advise as to their improvement. In the absence of accurate and reliable reports and statistics and in consequence of the varying and unmethodical systems prevailing, this would have been a long and specially difficult task. To get at the facts with any degree of accuracy it would have been necessary for us to visit each affected state in turn and there to hold much more close and searching local inquiries than was necessary in British territory. The time at our disposal precluded us from attempting such an investigation. We also felt that the character of any recommendations which might be usefully made by us would have to depend on considerations with which we were not competent to deal, as for example upon the extent to which the Government of India may think it politically advisable to put pressure on a particular native state to make it conform to the British methods of famine administration, and as to whether the states have the necessary executive machinery for carrying out these methods effectively. These are very wide and important issues lying outside the limits of our instructions, the adequate consideration and treatment of which would have entailed a much more extended inquiry than was contemplated when our Commission was appointed.

Matters Connected with Native States into which we have Inquired

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In these circumstances we have not felt it to be our duty to inquire into, and to offer recommendations regarding, famine relief operations in native states. We have however, during the course of our inquiries in British districts noticed facts occurring there the origin of which is traceable to native states, such as the influx of destitute persons or the cessation of import of grain owing to prohibition of export in a native state. We have also taken the evidence of two political officers, Colonel Thornton and Captain Pinhey, who were intimately connected with and had special knowledge of famine relief in native states. The evidence of these two officers will be found among the appendices to our report. Colonel Thornton was specially deputed by the Government of India to visit the affected states, to advise the states in the administration of relief and to see that relief was being given wherever wanted and that it was given on right principles. In this evidence before us, Colonel Thornton has given an account of his tour, of the conditions he found in each state and of the suggestions he made for their improvement. He has also made some general recommendations on the broader questions of famine relief, such as the control of emigration from distressed areas and the various forms of relief which should be applied and the method of conducting them. Captain Pinhey was political Agent of Banghelkhand where, as we have said, intense distress prevailed. He has given an account of the distress and of the measures taken to meet it, and has made some general recommendations for the future.

Treatment of Subjects of Native States in British Districts

A not unimportant question is the treatment of subjects of native states who may apply for relief in British districts. In the Narrative of the Famine in India in 1896-1897 (para 94) reference is made to this miserable condition of the crowds of wanderers from Bundelkhand and Baghelkhand who floaked to the poor-houses in the Nerbudda valley districts of the Central Provinces, and in the course of our inquiries our attention has frequently been called to the inconveniences occasioned by the influx to neighbouring relief works and poor-houses in British districts of destitute wanderers from native states. The Famine Commissioners in paragraph 189 of their report expressed the opinion that the proper course to adopt was to treat all applicants for relief alike whatever their nationality might be, and to admit them to relief without distinction as to origin. In this opinion we concur. We think however, that whenever any influx of immigrants from a native state takes place on a considerable scale, the local officers in the British district should endeavour by such enquiries as they may be able to make to ascertain its cause, and that the local Government concerned should promptly bring the facts to the notice of the Government of India. The Government of India would then through its political officers take such measures as it might deem advisable to ensure the proper administration of relief in the native state. We also think that in such circumstances it would be advisable to take steps to direct and control the emigration somewhat in the manner suggested by Colonel Thornton in his evidence. Posts might be stationed along the main lines of communication used by the emigrants where they would be questioned and advised as to where relief was to be found. This might prevent much aimless wandering. The emigrants would not be driven back to their state; but if the local officers in British territory had reliable information as to the existence of adjacent relief works in the native state they would informed the emigrants of the fact and advise them to go there. In the absence of such information, it would be the duty of the local officers to point out to them where the nearest relief centre in British territory was to be found.

COMMITTEE APPOINTED TO ENQUIRE INTO THE INDIAN CURRENCY OR INDIAN CURRENCY COMMITTEE, 1898 — REPORT[1]

APRIL 29, 1898

President	Mr. Henry H. Fowler
Members	Mr. Balfour of Burleigh; Mr. John Muir; Mr. Francis Mowatt; Mr. D. Barbour; Mr. C.H.T. Crosthwaite; Mr. Alfred Dent; Mr. F.C. Le Marchant, Mr. E.A. Hambro; Mr. W.H. Holland; Mr. Robt. Compbell.
Secretary	Mr. Robert Chalmers

Appointment

The Indian Currency Committee was appointed by the Royal Warrant of the 29th April, 1898 for consideration the proposals of the Government of India in 1893 and initiated in June of that year by the closing of the Indian Mints to what is known as the free coinage of Silver. That policy had for its declared object the establishment of Gold Standard in India; and to consider whether this object could be attained by the specific measures proposed by the Government of India or otherwise.

Terms of Reference

It will be the duty of the Committee to deliberate and report to upon these proposals and upon any other matter which they may regard as relevant thereto, including the monetary system now in force in India, and the probable effect of any proposed changes upon the internal trade and taxation of that country; and to submit any modifications of the proposals of the Indian Government, or any suggestions of their own, which they may think advisable for the establishment of a satisfactory system of currency in India, and for securing, as far as practicable, a stable exchange between that country and the United Kingdom.

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[1] Her Majesty's Stationery Office, London, 1899, 3 parts. (Presented to both Houses of Parliament by Command of Her Majesty C.-939).

Contents

Letter to the Right Honourable Lord George Hamilton, M.P., Secretary of State for India; The Monetary System of India; A Silver Standard; The Principle of a Gold Standard; The Indian Government's Proposals; A Gold Currency; Convertibility; The Sterling Rate for the Rupee; Conclusion; Note by E.A. Hambro; Note by W.H. Holland; Note by Robt. Compbell and John Muir; Note by Robt. Compbell, W.H. Holland and John Muir; Correspondence Respecting the Proposals on Currency made by the Government of India.

Recommendations

The Monetary System of India

It will thus be observed that, at the present time, gold is not a legal tender in India, though the Government will receive it in the payment of public dues; that the rupee remains by law the only coin in which other than small payments can be made; that there is no legal relation between rupees and gold; but that the Indian Government has declared (until further notice) a rate at which rupees can be purchased for gold coin or bullion - such rate serving to determine the maximum limit to which the sterling exchange can rise under present arrangements.

A Silver Standard

We cannot doubt that one of the main causes of the stringency of 1897-98 was the reversal (necessitated by the exceptional circumstances of India at the time) of the relations of the Government of India and the money market in the autumn of 1897. In ordinary years the Government is able, through the sale of Council Bills and Telegraphic Transfers, to place large sums at the disposal of the money market throughout the autumn and winter. Thus, during the last four months of 1894, the bills and transfers sold by the Secretary of State amounted to Rs. 8,052,000; in 1895, for the same period of the year, the amount was Rs. 9,888,000; in 1896 the amount was Rs. 6,056,900. But in 1897, owing to the deflation of the balances of the Government of India, brought about by expenditure on famine relief and military operations and by failing revenue, the Secretary of State was unable, from 1st September to 15th November, to offer hills or transfers for sale, and was compelled to purchase drafts on India for Rs. 1,000,000. Thus, during the last four months of 1897, the amount placed at the disposal of the Indian money market in the Presidency towns in consequence of the remittance transactions of the Government was only Rs. 332,700, or Rs. 5,724,200 less than the year before.

We do not doubt that the recent rise in the Indian exchange temporarily diminished the profits of the producers of tea, just as the previous fall had temporarily increased them; but, as we have already said, we see no reason to suppose that the strength of the competition of China tea will be permanently increased by the fact that China is on a silver basis. So far there is no evidence to show that the exports of China tea have appreciably increased, and there is evidence to show that the rise in Chinese wages and general prices has at least begun to take effect.

It appears to us that the permanent interests of the tea gardens of Ceylon and India will be promoted rather than injured when their operations are carried on under the same standard of value as exists in the countries to which their produce is exported.

We find that this question of the competition of China with Indian tea was specially considered by the Government of India in 1892, before the Indian units were closed to silver, in connection with a memorial on the subject from the Darjiling Planters' Association. The views of the Government of India on the subject are contained in a letter to the Honorary Secretary to the Association, dated 12th October 1892, and printed at pp. 176-77 of the Minutes of Evidence before Lord Herschell's Committee. The following extract from that letter contains a summary of the views which the Government of India expressed at the time :—

To sum up, the Government of India are of opinion —

(1) That a country, as a whole, makes no gain in its international trade by a depreciation of its standard, since the extra price received for its exports is balanced by the extra price paid for its imports.

(2) That the producer of an article of export may make a temporary and unfair gain from depreciation of the standard, at the expense of his employes and of other persons to whom he makes fixed payments.

(3) But that this gain, while not permanent, is counterbalanced by a tendency, to over-production and consequent reaction and depression, by a liability to sudden falls in price as well as to rises, and by the check to the general increase of international trade which necessarily results from the want of a common standard of value between countries which have intimate commercial and financial relations.

We are unable to find that anything has occurred since the closing of the Indian mints to silver to throw doubt on the soundness of the views expressed in 1892 by the Government of India.

We must add that the Government of India would not be justified in assuming that, with the mints re-opened to silver, the fall of the exchange to a shilling is the greatest fall which they might be called upon to face either immediately or at a future time.

In view of the considerations which we have stated, we concur with the Government of India in their decision "not to revert to the silver standard".

The Principle of a Gold Standard

It seems unnecessary to discuss the further considerations which point to the benefits to India of a gold standard. We desire, however, to remark that the effective establishment of such a standard in India would not preclude India hereafter from considering responsible proposals for an international agreement, if circumstances should arise to render such negotiations practicable.

Steps should be taken to avoid all possibility of doubt as to the determination not to revert to a silver standard, but to proceed with measures for the effective establishment of a gold standard.

The Indian Government's Proposals

We think it desirable that the proposals of the Government of India should, even under the altered conditions of the present day, be carefully considered by us.

We are unable to accept, without qualification, the opinion that the rise in the value of the rupee since 1894-1895 has been due, wholly or mainly, to a relative contraction of the Indian currency. We are not prepared to say that the contraction of the Indian currency has not been an important factor in the rise in the Indian exchange; but, so long as the facts of the case are surrounded by so much obscurity, we consider that it would be unsafe to base action of so drastic a character on this assumption.

Although we sympathise with the Government of India in their desire to shorten the period of transition, to inspire confidence in the commercial community, and to remove an impediment to the flow of British capital to India, and recognise the force of the pressure upon them in the beginning of 1898 to take immediate steps in a direction which, it was hoped, would lead to the desired result, we can only say that, for the reasons already stated, we do not approve of their proposals, and cannot recommend their adoption.

A Gold Currency

We are of opinion that the habit of hoarding does not present such practical difficulties as to justify a permanent refusal to allow India to possess the normal accompaniment of a gold standard, namely, a gold currency.

We are in favour of making the British sovereign a legal tender and a current coin in India. We also consider that, at the same time, the Indian Mints should be thrown open to the unrestricted coinage of gold on terms and conditions such as govern the three Australian Branches of the Royal Mint. The result would be that, under identical conditions, the sovereign would be coined and would circulate both at home and in India. Looking forward as we do to the effective establishment in India of a gold standard and currency based on the principles of the free inflow and outflow of gold, we recommend these measures for adoption.

Convertibility

Under an effective gold standard rupees would be token coins, subsidiary to the sovereign. But existing conditions in India do not warrant the imposition of a limit on the amount for which they should constitute a legal tender; indeed, for some time to come, no such limitation can be contemplated.

We do not consider it necessary to recommend a different policy in the case of that country from that which is found sufficient in France and the United States, by imposing a legal obligation on the Government of India to give gold for rupees, or, in other words, to substitute the former for the latter on the demand of the holders. This obligation would impose on the Government of India a liability to find gold at a moment's notice to an amount which cannot be defined beforehand, and the liability is one which, in our opinion, ought not to be accepted.

Although the Government of India should not, in our opinion, be bound by law to part with its gold in exchange for rupees, or for merely internal purposes, we regard it as the principal use of a gold reserve that it should be freely available for foreign remittances whenever the exchange falls below special point; and the Government of India should make it gold available for this purpose, when necessary, under such conditions as the circumstances of the time may render desirable. For example, the Government of India might, if the exchange should a tendency to fall below specie point, remit to England a portion of the gold which it may hold - a corresponding reduction being made in the drawings of the Secretary of State; and, when it has accumulated a sufficient gold reserve, and so long as gold is available in its Treasury, it might discharge its obligations in India in gold instead of in rupees.

The exclusive right to coin fresh rupees must remain vested in the Government of India; and, though the existing stock of rupees may suffice for sometime, regulations will ultimately be needed for providing such additions to the silver currency as may prove necessary. The Government should continue to give rupees for gold, but fresh rupees should not be coined until the proportion of gold in the currency is found to exceed the requirements of the public. We also recommend that any profit on the coinage of rupees should not be credited to the revenue or held as a portion of the ordinary balance of the Government of India, but should be kept in gold as a special reserve, entirely apart from the Paper Currency reserve and the ordinary Treasury balances.

The Sterling Rate for the Rupee

We have now to consider the fixed relation which, under a gold standard for India, the rupee should bear to the sovereign. Hitherto we have dealt in general terms with the question of a gold standard, and our recommendations have presupposed a fixed relation, but have not specified the actual rate which should be adopted.

The Government of India proposed in 1892 to close the Indian mints to silver and to pass an Act authorising them to declare gold a legal tender at a rate not exceeding 18d. for the rupee. They would not have exercised this power at once, and they would have been guided by circumstances and the experience gained by the closing of the mints in determining what should be the fixed, permanent, legal ratio between the rupee and the sovereign. The rate could not, however, under the law proposed by the Government of India, have exceeded 18d. for the rupee, though it might have been lower.

The proposals of the Government of India were generally approved by Lord Herschell's Committee, but the Committee recommended a provisional limit which would prevent the exchange with India from rising materially above 1*s*.*4d*. for the rupee. The Committee did not recommend that the limit of 1s.4d. for the rupee should be the permanent legal ratio between the rupee and the sovereign. It left the question of the permanent legal ratio between the two coins to be decided in the light of subsequent experience. In paragraph 151 of The Committee's Report the following language is used : —

"It would not, of course, be essential to the plan that the ratio should never be fixed above 1s. 4d.; circumstances might arise, rendering it proper, and even necessary, to raise the ratio; and the Indian Government might be empowered to alter it with the sanction of the Secretary of State. Such a scheme would, indeed, in the first instance, be tentative, and would not impede further action if circumstances should render it desirable.

The modifications of the proposals of the Government of India recommended by Lord Herschell's Committee were accepted, the Indian mints were closed to silver, and a provisional arrangement was made for giving rupees in exchange for gold at the rate of 16d for the rupee.

The maximum limit of 18d. for the rupee, originally suggested by the Government of India, was not imposed, and the question of the permanent legal ratio can now be considered in the light of what is expedient in the present day, and unfettered by any promises made, or conditions imposed, in the past.

We also desire to point out that the rate of 1s.4d. is that of the present day; prices in India may be assumed to have adjusted themselves to it, and the adoption of a materially lower rate at the present time would cause a district and, in our opinion, a mischievous disturbance of trade and business. The *anus probandi* rests on those who would now propose a different rate. Between the rate of 1s.4d. and the rate determined by the bullion value of the rupee, there is no one rate which can be described as natural or normal, rather than any other rate.

In our opinion a rise in prices which expresses only the depreciation of the currency is no gain to the community as a whole, and, although the fixing of a lower denomination is sterling for the rupee might for a time give same advantage to producers and induce for a limited period a larger importation of gold than would otherwise take place, this would be at the expense of every holder of a rupee, or debt or security for a fixed amount of rupees; and the tax payer would again be compelled to provide a larger amount of currency to meet the sterling requirements of the State. It is not by such an expedient as the writing down of the rupee in sterling that a permanent stimulus can be given to production or to the importation of the standard metal. We see no sufficient reason for altering the existing relations of prices and the essential conditions of contracts expressed in Indian currency, or for reversing the course of exchange and returning to some basis of value which may have prevailed during the interval between the fall and partial recovery in the sterling value of the rupee, and which does not possess elements of permanent stability in a higher degree than the present rate. We are, therefore, of opinion that the permanent rate should be that which has been and opted as the provisional rate in the past, and which is also the market rate of today, viz., 1s.4d. for the rupee.

In recommending a fixed legal rate of 1s.4d. we are not unanimous, though the majority hold the views we have just expressed.

We recommend that there should be no change in the existing relation of the rupee to the sovereign. The experienced gained since the mints were closed in 1893, and particularly that of the last eighteen months, appears to us to justify the anticipation that the existing rate of 1s.4d., will, with possible temporary fluctuations, due to the course of trade, be maintained in the future.

Conclusion

In conclusion, we desire to record our opinion that the effective establishment of a gold standard is of paramount importance to the material interests of India. Not only will stability of exchange with the great commercial countries of the world tend to promote her existing trade, but also there is every reason to anticipate that, with the growth of confidence in a stable exchange, capital will be encouraged to flow freely into India for the further development of her great natural resources. For the speedy attainment of this object, it is eminently desirable that the Government of India, with whom it will rest to decide when successive steps should be taken, should husband the resources at their command, exercise a resolute economy, and restrict the growth of their gold obligations.

COMMISSION APPOINTED TO INVESTIGATE THE NATURE OF KALA-AZAR, 1898
— REPORT[1]

FEBRUARY 17, 1898

President One Man Commission : Major Ronald Ross

Appointment

On the 17th February, 1898 Major Ross was placed on special duty for six months to investigate malaria and Kala-Azar under the Director General, Indian Medical Service.

Terms of Reference

To investigate malaria and Kala-azar.

Contents

Preliminary; The Symptomatology of Kala-Azar; Pathological Enquiry; the Pathological difficulties discussed; the epidemiological difficulties discussed, Conclusions; Recommendations.

Conclusions

39. *The Nature of Kala-Azar* - It will be advisable, before attempting to draw final conclusions, to separate the facts from the theories in the previous discussions. The facts appear to me to be as follows :—

1. Kala-azar is an epidemic and communicable disease.
2. Its symptoms are very like those of malarial fever. In

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[1] Office of the Superintendent of Government Printing, Calcutta, India, 1899, 87p.

established, i.e. fairly advanced, cases, the disease consists principally of considerable enlargement of the spleen and liver, accompanied generally by a low fever, a certain degree of anaemia, and other secondary symptoms. The history of such cases is always that the illness commenced with high fever, generally with repeated rigors; and that the organs began to enlarge after this fever had lasted some time.

3. The death-rate is high; but recovery often occurs.
4. The disease is known to exist only in malarious localities.
5. In Nowgong, side by side with the cases of established kala-azar, there were numerous cases of typical early malarial fever, in which the malarial parasites were found in abundance, and which already showed commencing and rapidly increasing enlargement of the liver and spleen. There were also cases of a later stage of malarial fever, in which the organs were more enlarged and a few parasites were found; or in some of which, if no parasites could be detected, melanin could be obtained from the spleen.
6. In cases of established kala-azar at Nowgong, the parasites of malaria were found in a few of the more recent ones, and melanin aline in the organs of a few more; but in many, including some autopsies, no parasites and no melanin at all could be detected. In most of the last, both enlargement of the organs and low fever were present. Yellow pigment was found in a large number of the cases.
7. Kelseh and Kiener state that melanin is often absent in cases which they describe as malarial fever, a few months after the beginning of the illness. Denials states that in British Guiana the majority of enlarged spleens contain no melanin. Vandyke Carter, and Kelsch and Kiener describe a secondary fever, not due to the parasites, connected with malarial fever; and Daniels notes the existence of a similar fever in case of enlarged spleen, even in cases when the enlarged spleen contained no melanin.
8. There is no evidence to show that melanin always remains permanently in the organs.
9. In seven autopsies on cases of established kala-azar, no difference could be detected between the cellular structure

of the organs of cases in which melanin was absent and that of cases in which it was present. Fatty degeneration was generally absent.

10. No evidence was obtained by me of kala-azar being due to any cause other than malaria.
11. Ankylostomes were found in a considerable number of the cases of kala-azar examined by me.
12. Ankylostomes do not produce enlargement of the liver and spleen.
13. Numerous epidemics of a disease thought to be malarial fever are on record.
14. One of the malarial parasites of birds, proteosoma, is communicable from sick to healthy birds by the agency of the mosquito.
15. The mosquito stage of one of the parasites of human malaria has been partially followed.

These facts drive us at once to the following alternative :—

(a) Kala-azar is not malarial fever; but a disease macroscopically and microscopically similar, except for the absence of the parasites and melanin. If so, this disease exists also in British Guiana, and possibly in other localities; but only in localities where typical malarial fever abounds as well.

(b) It is malarial fever; in most cases of which the parasites disappear toward the later stages of the disease, and in a few cases of which the melanin also disappears at a still later period, leaving the enlargement of the organs accompanied by a low fever. If so, the disappearance of the parasites and melanin occurs also in British Guiana, and possibly in other localities, and must be explained.

The theories attempt thus explanation. They endeavour to show :—

1. That a malarial infection consists of a continued pervasion of the blood by the parasites, which however, in normal untreated cases increase and diminish in numbers in alternating periods, corresponding with the alternating periods of fever and apyrexia.
2. That this continued parasitic pervasion tends toward

extinction, either by spontaneous exhaustion or by the gradual establishment of immunity in the host.

3. That special condition, especially those in which kala-azar occurs, are likely to accelerate this process of extinction of the parasites.
4. That the species of parasite concerned is likely to influence the amount of melanin deposited in the organs and, therefore, the period in which it is got rid of.

Reviewing the subject, we see that :—

1. The alternative (a) given above is exceedingly in acceptable. No observations of a disease exactly like malarial fever but in which either the parasites or melanin have not been found in the early stages on exhaustive examination are on record. It is highly improbable that two diseases should present such close pathological similarities, and that one should exist only within the boundaries of the other and yet be essentially different.
2. The alternative (b) can be in acceptable only on one ground, namely, that melanin once deposited can never be eliminated under at least a year or so. In the absence of precise knowledge as to how long the elimination of melanin requires, we are not justified in admitting this.

To come to a conclusion then :

The probabilities against alternative: (a) are very great; but the only final objection against alternative (b) is one based upon a postulate which is not proved, and which is scarcely even probable.

Unfortunately, in the science of medicine we can seldom attain to the absolute proofs of the exact science, and when we say that a given issue is proved or disproved we must imply as a rule only that the probabilities for or against it are very large.

Speaking entirely in this sense, I am willing to say that I think alternative (a) must be abandoned.

I am, therefore, of opinion, after a very careful survey of the question - and, I may add, an entirely impartial one, so far as I am concerned - that though the objections to the malarial theory of kala-azar are serious enough to require minute scrutiny, they are not strong enough to withstand the numerous facts in favour of the theory. I think, then, with Rogers, that kala-azar is malarial fever.

40. *The Pathology and Epidemiology of Kala-azar* - Conclusions regarding details of the disease may be briefly added here.

I have already expressed my views of the symptomatology in paragraph 6. The course of the malady is divided into three stages, the characteristics of which are :—

Recurrent conflagrations of high fever with rapid enlargement of the spleen, and generally also of the liver in the first stage.

Great tumefaction of the organs with low fever in the second stage.

Cachexia, with gradual decrease of the organs, disappearance of the low fever, and, frequently, intercurrent attacks of pneumonia and of dysentery in the third stage.

I think that the first stage is chiefly that of the parasitic invasion; the second stage that of the secondary effects of the invasion; the third stage that of the tertiary effects, namely, the result of the secondary effects.

Thus, the beginning and the end of the second stage should be marked by the beginning and the end of the low fever. At first we have only the manifestations of the parasitic invasion, consisting of repeated attacks of typical malarial fever; gradually, as the system begins to feel the effect of the invasion on the organs, the low fever sets in; finally, unless death has occurred, recuperation is attempted in the face of the conditions left by the previous stages.

As far as I can gather, the low fever commences about the end of the first, second or third month of the illness; and it tends to cease, I think, in nine months or more from the onset of the disease. It is probable that the low fever sets in earliest in the severest infections.

It seems both convenient and accurate to select the low fever as the sign of the second stage; it is easily detected by the thermometer, and should represent the degree of the secondary effects, to which entirely, and not to the parasites themselves, I ascribe it.

The parasitic invasion, however, probably lasts well into the second stage, ever decreasing according to its duration. At the same time the system feels the toxic effect of the parasites less and less; but suffers more and more from the residual condition of the organs and the low fever.

The melanin is, I think, constantly being eliminated as it is deposited; and some months after it ceases to be deposited, that is, after the invasion is exhausted, it is probably get rid of altogether in many cases. Judging from Case 71 this may be accomplished in seven months from the onset.

There seems to be a rapid fall in the number of red corpuscles after each parasitic exacerbation, with a corresponding recuperation afterwards; but in the second and third stages the anaemia seems to me to remain constant, being maintained by the secondary effects. Kelsch and Kiener note this in paludism in general. It is presumed that the yellow pigment results more from the anaemia due to the secondary effects, than from that due to the parasites themselves.

Edema may appear early in the second stage, but more commonly toward the end of it.

The end of the second stage, when the system exhausted after the severe illness lies prostrate to intercurrent affections, seems to be the most dangerous epoch. Now, too, if any considerable number of ankylostomes are present, they must begin to make themselves heavily felt. Death is actually caused in most cases by dysentery, diarrhoea or pneumonia; but in many ankylostomes and even other worms have played an important part in the final scenes.

I can give no evidence regarding darkening of the skin.

I was not able, in the short time at my disposal for the enquiry, to assure myself regarding the species of the malarial parasite which causes kala-azar, or even whether the disease is caused by a single species.

Whatever species it may be due to, however, I conceive the disease to be a form of paludism in which the infection falls with a very heavy incidence on the spleen and liver, especially the latter. It is, in fact, the secondary symptoms - the enlargement of these organs and the low fever - which are the gravest feature of this disease and which, I think, are the chief cause of the exceptional mortality. It is well-known that in some localities and in some races the parasites effect those organs but little; in others much. Why this should be we cannot say. But the fact remains that kala-azar is principally a manifestation of the secondary results of malarial fever.

I will add here some remarks of Dr. Daniels on the sections examined by him. "The minute anatomy", he writes, "shows merely evidence of a haemolytic disease. Direct evidence of malaria, i.e., black pigment, is wanting in some of the cases. If the haemolysis, of which the yellow pigmentary deposits give evidence, be the result of malaria, this must be of some form in which the haemolysis is quite out of proportion to the melanosis or direct product of the organism, and would, therefore, probably indicate a specific form of parasite differing at any rate in its chemical activities from that met with in British Guiana. The absence of fatty changes and the different disposition of the pigmentary and ferruginous granules prevent any support from the structure of the organs being given to the theory of ankylostomias is".

It appears possible to me, however, that the evidences of haemolysis referred to here are not so much the effect of a particular parasite with special chemical activities, as of the great secondary enlargement of the organs and the concomitant low fever. If these cause anaemia, as they most certainly do, they may be expected also to yield evidences of haemolysis.

By such a theory the yellow pigment would be a result, not a cause, of the enlargement of the organs. In Case 75, for instance, the spleen was greatly enlarged, congested and tender; yet post mortem it was found to contain no yellow pigment to account for its condition. But there was yellow pigment in the liver-which was little affected.

The epidemiology of kala-azar must be that of malaria is general, and is bound up in the life-history of the parasites of men and of birds is similar. Protoeosoma of birds is communicable from sick to healthy birds through the agency of the mosquito; but there is evidence in the existence of the black spores of a second more circuitous route for the infection though it seems to me very likely that actual infection in malaria is produced only through the venonoslaivary gland of the insects.

Some steps in the mosquito stage of the human aestivo-autumnal stage have been followed in "dappled-wigged mosquitoes". So far as they went, those steps were exactly similar to the corresponding ones of proteosoma, strongly suggesting a similar history throughout.

It appears to me possible that other suctorial insects, as well as mosquitoes, may also carry the infection of malaria.

While, then, I am of opinion that malarial fever is a communicable disease, I think that it is only indirectly so — through insects - and that for communication it requires the presence of the proper species of insect. I think also that there is a second cycle the nature of which has not yet been elucidated.

While I consider, as I have said, that kala-azar is a form of malarial fever with a marked incidence on the spleen and liver, I must add that I think its mortality is considerably enhanced by the presence of ankylostomes and other intestinal parasites, and of dysentery in very many of the cases.

I must also guard myself against being interpreted to mean that malarial fever of this type is confined to cases of so-called kala-azar and kala-jwar. On the contrary, I think that isolated instances of a precisely similar fever occur more or less throughout India, and that in particularly malarious localities they occur in large numbers. As to why the disease should be more prevalent in some localities and why its prevalence now in Assam amounts to an epidemic, I can offer only conjectures (paragraph 38); but there is nothing in these facts to prejudice the view that the disease is of a malarial nature.

I think that kala-jwar in the Darjeeling Terai is practically the same as kala-azar in Assam.

Recommendations

41. *Professional Recommendations.* — Kala-azar is a local disease; but it is a form of the most important of tropical diseases, malarial fever, and a form which is probably by no means confined to Assam. Hence the difficulties which it has presented appear to me to be of great and general importance. I have no doubt that a similar form of malaria, possessing similar points of interest, occurs widely throughout the tropics. And these points of interest are far from being merely academical, but are intimately bound up with questions of the proper diagnosis and treatment of malarial fever in general, I will now endeavour to show how this is the case.

Kala-azar is interesting for the following reasons:

(a) The frequent complication by ankylostomes;
(b) The early extinction of the primary malarial invasion, and the subsequent elimination of the melanin;
(c) The heavy incidence of the invasion on the spleen and liver; and the secondary low fever and
(d) The communicability of the disease.

With regard to the complication by ankylostomes, so much excellent matter has been written by Rogers that I have only some isolated remarks to offer. I agree with him that kala-azar is not ankylostomiasis; but this does not imply that I underestimate the importance of the worm in many cases of the disease, and in Assam generally as in other localities. These parasites were found in 11 out of 16 cases of kala-azar which were carefully searched for them; and it was obvious that in several instances they amounted to complication. In several, however, such as Case 75, none could be detected; while in others they were obviously present only in small numbers and were producing no discernible symptoms. I concur entirely with Rogers and others that when present in large numbers they produce a condition to severe anaemia which does not belong to kala-azar pure and simple, and which often suffices to show the existence of this complication at a glance. The two diseases are quite different; the one being a fever, with an early history of a sudden febrile attack, leading to great enlargement of the organs; the other being a slowly progressive anaemia, without enlargement of organs, but sometimes accompanied by slight fever (Daniels – Appendix A).

Hence, it might be thought that the differential diagnosis should be easy – at least, where the diseases exist in different persons. This, however, is not always the case – if we rely upon microscopical symptoms alone. It is true that malarial fever in its earliest stages of severe recurrent pyrexia and in its second stage of enlargement of the organs (if this exist) can scarcely be mistaken for ankylostomiasis. But in the later stages, where tumefacation of the organs has not occurred to any great extent, or when it has subsided on the establishment of cachexia (paragraph 6), and when the final anaemia and oedema of malarial cachexia are very marked, the diseases may certainly be easily confounded.

How, much, then, must the difficulty of judging be enhanced when both the diseases exist in the same person – that is, when ankylostomes are present in the third stage of paludism? In the earlier stages of the latter, when we find the outhursts of typical malarial fever or the enlargement of the organs to be constantly attended by more anemia than is usually associated with such symptoms, we are justified in suspecting the presence of ankylostomes at once. If, for instance, we are confronted by a case of excessive anaemia and dropsy, with marked tumefacation of either the liver of spleen or both and a malarial history, we can scarcely hesitate in ascribing the condition to both diseases. But later, when the epoch of the fever has passed, when malarial cachexia is pronounced, when the organs have subsided to their normal sizes, and only anaemia and dropsy remain as the final consequences of this cachexia – symptoms equally of ankylostomiasis – how are we to determinate? How tell whether the condition is paludism simply, or paludism plus ankylostomiasis, or even the latter alone? Yet it is just at this stage when we are most urgently called upon to detect the complication if it exist, because it is just the stage of a malarial infection when ankylostomes are calculated to have the most fatal effect – when the system, already weakened by months of a severe illness, requires all the strength it can summon, and can least afford to support these debilitating entozoa.

Again, even in the earlier stages of paludism, when the ankylostomes, though present, are so few that they cause no visible anemia, are we justified in ignoring their presence? On what grounds may we do so? Suppose the paludism to be severe and to threaten a critical third stage, when the question of recovery will depend on the final resources of the system, is it not necessary that these resources should be husbanded to the utmost from the first, the ankylostomes may be too few to occasion anaemia at this early stage, but may still make their presence felt heavily at a later one. If they produce no anaemia, how are they to be detected? In other words; are we justified in waiting for the entozoa to diagnose themselves, so to speak, by establishing an anaemia which will probably kill the patient?

This raises the general question of the proper diagnosis of ankylostomes. Are we ever justified in allowing these parasites to diagnose themselves in this manner? To wait until they have disclosed themselves by inflicting a grave, perhaps a fatal injury, when we have ready at hand the simplest and most certain method of detecting their presence, would seem to be one of the most inexcusable of doctrines and practices.

And this question does not apply only to Assam. It applies probably to the greater part of India, as the literature of the subject shows clearly enough (15, 17, 18, 19, 20, etc.). The worms have a very wide distribution and probably cause a monstrous mortality.

The pleasant and easy beliefs so sedulously repeated, that the worms are harmless, or that they are harmful only in large numbers, such as five hundred or so, have certainly had a bad effect on tropical medicine. This has been noted by many writers, and the Sanitary Commissioner with the Government in India has referred to the matter frequently in his Annual Report – apparently without much influence on these unfortunate popular notions.

Such notions are merely part of that curious heresy that all parasites and "germs" are "harmless" – a most groundless belief, due to insufficient consideration of the subject. The correct professional attitude toward questions of this nature is that there is a *prima facie* case against every parasite. Any and every species of parasite should, in the interests of our patients, be held to be harmful unless and until the contrary be absolutely proved; they are intruders, and, therefore, their capacity for mischief is at least a presumption which should be acted on in the absence of complete proof to the contrary. Those who proceed on the supposition that parasites are harmless ignore the possibility, which always exists, of their not being so, and, in consequence, subject their patients to considerable risk; – which, I venture to say, is incorrect medical practice.

The stock argument against the harmfulness of parasites is that they often occur in apparently healthy persons – an argument of the most unscientific nature. The total sickness produced by parasites must depend on the capacity for mischief produced by each parasite, the number of parasites, and the strength of the patient (paragraph 29); and it is quite possible that considerable numbers of some parasites may exist in strong, well-nourished hosts without causing mischief, while the same parasites in the same or smaller numbers may kill more weakly patients.

It is obvious that a strong, young, well-fed man will support a much larger number of ankylostomes without inconvenience than a cachectic struggling between life and death can. To argue that, because the first endures them with impunity, therefore every one can do so is quite absurd. We cannot fix with certainty the number of ankylostomes required to produce harmful effects– the number is, in mathematical language, a function of several independent variables.

I believe that most medical men who should happen to find themselves possessed of even a few of these entozoa would not delay in ridding themselves of them. Our duty to our patients, then, demands that we use every precaution to detect and expel them from those who are placed in our care.

The drift of these observations must now be obvious. We possess in the microscope an easy and almost sure means of ascertaining the presence of ankylostomes - a means which must not be neglected in cases where the parasites may by any possibility exist. And this leads me to my first recommendation: - The dejecta of all patients in localities where ankylostomes are present should be examined for the ova of these worms as a routine duty. This recommendation applies to many parts of India, to Europeans as well as natives, to soldiers as well as civilians. Remarks as to its feasibility will be made presently. The use of thymol as a diagnostic measure is, of course, not generally excusable when the microscope can be used.

The question of the spontaneous extinction of the parasitic invasion in old cases of paludism is one to which I invite particular attention because of its bearing on treatment by quinine. Empirical practice has already discovered that this drug is not so efficacious in advanced as in early stages of the disease. Its effect appears to be solely or chiefly that of a poison to the parasites; and it is clearly unnecessary to employ it in large doses when there are no longer any parasites remaining to kill.

What my observations on kala-azar tend to show is that this stage may be reached very much earlier than, to judge by the continuance of fever, we may be led to expect. In such cases, however, the fever is the *febris secondacia post malaria.*

I am convinced that a similar early extinction occurs in thousands of cases all over India - that the invasion is often nearly or completely quelled at a time when the appearance of daily fever, sometimes of a rather severe type, would lead us to imagine it to be very active.

In many of the kala-azar cases in which such fever was occurring, the absence of the parasites was proved most conclusively, not only by a failure to find them in repeated examinations of the finger-blood, but by the fact that blood from the spleen contained no pigment. Cases 61 and 62 were typical of this condition; and so was case 75, until the final weak invasion, which occurred just before death, set in.

Now quinine in large doses is invaluable during the parasitic stage; but in such doses it is often distressing to the patient, and may even be hurtful at a time when the patient requires good alimentation to support him through the illness. Why then given it when no longer required?

This leads to my next recommendation: Before attempting to treat a chronic case of paludism it is necessary to assure oneself as to how for the parasites are still present.

Regarding the incidence of kala-azar on the organs and the low fever, I think that malarial fever in all parts of the tropics frequently shows similar phenomena. We must, therefore, not imagine that a case of chronic paludism always consists of nothing else but an invasion by the parasites of the red corpuscle. There is reason to believe that long after these have vanished, the secondary effects which they leave behind them may still destroy the patient. Practically speaking - that is, speaking from the point of view of treatment - most of the cases of kala-azar at Nowgong were no longer cases of malarial fever; they were cases of enlargement of the liver and spleen with a concomitant low fever, and required treatment as such. The treatment which, I think, would commend itself to most practitioners would be that by alkaline laxatives, weak quinine and arsenic, and, above, all the best possible dieting.

I recommend, therefore, that in the older cases of malarial fever the closest possible attention be paid to the secondary effects of the parasitic invasion.

These recommendations may, I think, be accepted as being founded on assured facts; my next one, however depends more on hypothesis, namely the hypothesis of continued pervasion of the blood by the parasites, advanced in paragraph 29.

Usually, except in such patients as we can keep continually under treatment, quinine is given or taken only during the periods of fever. The patient then doses himself freely; the parasites are destroyed to a certain extent; partial recovery ensures, and the drug is no longer employed. But presently, no longer being checked by the quinine the parasites multiply again and another attack of fever ensures - to be treated in a similar manner. Such treatment appears to me to be quite insufficient; correct treatment would aim not at reducing the parasites temporarily, but at exterminating them altogether.

The question whether the parasites during the apyrexial periods undergo encapsulation or continue to propagate themselves as usual in small numbers, is important as regards treatment, because in the former case quinine may be useless during such periods, and in the latter case small doses, persisted in for a long time, should suffice to conclude the infection.

I believe in the latter alternative for many reasons; and therefore recommend as follows: - Quinine should be given continuously for weeks or even months after an attack of (parasitic) fever. Small doses (up to 10 grains daily, according to the patient's amenability to the drug) generally suffice, if given with great regularity; especially if given in the morning, just before breakfast. I can speak with experience of this method, which I have frequently used. On the other hand, I generally find that it is those patients who take quinine only when they "are getting fever" who suffer most from secondary effects.

The examination of the blood for the parasites of malaria, though quite easy to those who have mastered the technique, is not so easy or rapid a process as the examination of dejecta for the ova of intensional parasites. Moreover, while always useful, it is not absolutely necessary when the typical fever suffices to establish the nature of the disease. Hence I hesitate to recommend its adoption as a routine. But in doubtful cases, and in old cases of paludism, where it is necessary for the purpose of treatment to ascertain how for the symptoms are secondary and how far they are still being caused by the presence of parasites, correct practice demands a search being made for the organisms. Further than this, in some doubtful cases where no parasites can be detected in the doubtful cases where no parasites can be detected in the peripheral blood, of where there are severe secondary symptoms which may be due partly to a small remanent of the parasitic invasion, exploration of the spleen for parasites or recent melanin is advisable. Hence I recommend that search for the parasites of malaria or for melanin should be carried out where required for purposes of treatment.

These recommendations for diagnosis and management in paludism may be collected in a more orderly manner, as follows:—

1. Search for the parasites of malaria or for melanin should be made when required.
2. Early cases, in which the parasites are found by the microscope or are inferred to exist from the presence of the typical fever, must be treated by large doses of quinine (given if possible an hour or so before the birth of each fresh generation of the organisms).
3. Quinine in smaller doses should be rigorously continued after the febrile period, long enough to ensure the final extermination of the parasites from the system.
4. In older cases, it is necessary to ascertain how far the parasites are still present. If found, they must be exterminated as soon as possible by large doses of quinine. If not found, we have still no right to inter that they are absent; and should, therefore, exhibit small doses of quinine daily for weeks or months on the chance that some of them still remain.
5. Crescents do not produce fever; continued small doses of quinine are required when they only are present.
6. In other cases, we must always remember the possibility of any fever which may exist being wholly or partly a secondary fever, especially if it exhibit the characteristics given in paragraph 32, and if the exhibit the characteristics given in paragraph 32, and if the spleen or liver are enlarged. It should be treated by daily small doses of quinine to ensure destruction of any parasites which may still be present, and by attention to the state of the organs to which this kind of fever appears to be due.

7. If the spleen be much enlarged, there is a presumption, as regards natives of India, that the parasitic invasion is quite or nearly exhausted; and this presumption is strengthened if there be no more attacks of the typical malarial fever. In such cases attention should be devoted particularly to the state of the organs; large doses of quinine will probably be found useless if not harmful; and we should depend on laxatives, tonics and good food — especially, I think, fresh milk.
8. In the last stage, dieting and attention to the frequent intercurrent complaints, such as diarrhoea, dysentery and worms, must be depended on.
9. In all cases of chronic malarial fever, microscopic examination of the dejecta for the eggs of worms, especially of ankylostomes, is an absolute necessity. And the examination should be repeated a week and more after vermifuges have been given, in order to ascertain whether any worms remain. The employment of thymol in large doses without previous examination of the dejecta is not as a rule defensible, unless the latter course cannot be adopted.

It will be perceived by the experienced practitioner that many of these counsels are "counsels of perfection", which can more easily be written down than followed; nevertheless, an attempt can be made to follow them in a large number of cases.

I have recommended the microscopical examination of the dejecta as a routine, and of the blood when necessity arises. It may be objected that these recommendations are impracticable and that medical men have no time to carry them out.

The examination of the dejecta is an extremely easy process; requiring only the humblest instruments and capable of being performed by all hospital assistants. Any medical officer can easily train his subordinates in a few days to do the work; and after that only his superintendence will be required. The technique is merely to place a small portion of the dejecta with a piece of stick in a drop of water on a glass slide, to impose a cover glass, and to examine with a medium power. The eggs of the different worms are figures in the text-books (14 and 26). In my experience, medical subordinates soon take considerable interest in the task; and, in short, there is little excuse for not making these very necessary examinations.

The examination of the blood, however, requires high powers of the microscope and some experience. Medical subordinates can do this work also, as I have found; but the medical officer must first be himself well acquainted with the subject. Though I certainly do not think it necessary, or even possible to examine the blood of every simple fever case which comes to hospital, I do think it necessary for all medical men practising in the tropics to make themselves familiar with this, the most important part of the study of the most important tropical disease. It is impossible to ignore the exigency of this duty, however troublesome it may be.

I should like to commend to those who care to undertake research the further study of the secondary fever; and to those who have opportunity for making autopsies, the condition of non-pigmented enlargement of the spleen.

42. *Official Recommendations*

With regard to the prevention of the present epidemic of kala-azar, I have little to add to the recommendations of Captain Rogers in Section X of his Report, which I beg to endorse.

I am of opinion that kala-azar is communicable from the sick to the healthy in some indirect manner, and that the infection tends to cling to houses.

I think also that there is a certain external condition required for the extension of the disease - probably the presence of some particular species of mosquito or other suctorial insect.

Any attempt to control the epidemic by the elimination of this external conditions is not likely, in the present state of our knowledge, to be successful.

It is necessary, then, as regards preventive measures, to treat the disease simply as a communicable one, and as one the infection of which adheres to dwellings - in other words, as a disease which spreads in a manner somewhat similar to plague.

The measures already proposed by Rogers appear to me the only ones likely to affect this; namely, (1) the control of communication between affected and healthy sites; and (2) the vacation of infected sites.

I have been informed by Drs. Lavertine and Price that these measures appear to have been successful to a large extent in the tea-estates near Nowgong.

In my opinion, however, based on a considerable experience, no measures aimed at controlling epidemics in India are likely to be successful unless placed in the hands of capable officers specially deputed for the purpose - as in the case of plague.

One or more energetic medical officers employed in this manner may be able to do much. If it be found feasible to make such appointments, the organisation may be briefly as follows:

(1) Each special officer should be placed in charge of a locality where numerous cases of early kala-azar or severe fever are occurring.
(2) Hospital assistants who have now been allotted to village dispensaries in that locality should be placed under his orders.
(3) It should be his duty to make himself acquainted with the incidence of the disease in his district; to conduct any preventive operations which may be decided upon; and, above all, to superintend closely measures of medical relief in the most acutely-affected villages.

Frankly speaking, I do not think that any organisation failing short of this is likely to be of much avail. If one junior medical officer be appointed for a preliminary trial, the cost will not be much, as numerous additional subordinates are already employed on the duty.

I lay particular stress on medical treatment, because I believe that much can be done in this line if, and only if, the treatment be carried on under close European supervision. I refer specially to the treatment of early cases of fever by quinine. If camp dispensaries, under hospital assistants and supervised by the special medical officer, be placed near to villages where acute fever is raging; if the special officer be sufficiently active to visit these dispensaries frequently in turn and to attend personally as often as he can to the fever cases; if the patients be encouraged by this influence to take quinine freely, I think it likely that a great saving of live will result. I say early cases of fever, because the old cases of cachexia are probably beyond treatment by quinine; hence the most recently affected villages should be selected for the experiment.

It would be fatal to the experiment to give the special officer to large an area to work over. An extension of the method could be adopted if the first results be at all encouraging.

The special officer should be allowed to move his own subordinates according to his discretion. His time should on no account be taken up by the compilation of returns. He should be encouraged to make all suggestions which he thinks fit to offer. He should understand that his duties extend to the care of patients and the prevention of the disease where practicable; and not to scientific research, except in the second place. He should know how to use the microscope for the treatment of malaria and ankylostomiasis. He and his subordinates would probably require tent equipage.

A call for volunteers for the duty would probably permit of a good selection being made.

I do not know whether this scheme will be considered feasible. I fear, however, that I can suggest no other which is at all likely to have any influence in checking the resent epidemic of kala-azar.

But as I have frequently pointed out, the questions with which we are concerned in kala-azar apply also to malarial fever in general; and as my present duty extends to a consideration of this, I think I should take the present opportunity to draw attention officially to a very important matter - referred to in the preceding paragraph - the proper scientific method of diagnosis in malarial fever and ankylostomiasis.

In the use of the microscope science has given us a means of diagnosis in these diseases which generally far exceeds in accuracy the old symptomatological methods, and which is frequently essential to the correct treatment of patients.

In the opinion of every authority on these diseases these means should be often employed; that is, I think, as a routine as regards ankylostomias is, and, when necessary, as regards malarial fever.

The intestinal worm called ankylostomum duodenal, which lives by suction of the blood, is known to be widely prevalent in India, and causes, directly or indirectly, a mortality the extent of which will only be gauged when the microscope is generally used for its detection; while malarial fever is well known to be the most important of tropical diseases.

Many medical men now employ the microscope in the diagnosis and treatment of these disease; and the time appears to be ripe for urging its general use by the profession. I beg, therefore, to recommend that the medical services in this country be encouraged gradually to introduce the method referred to into the ordinary practice.

For this, the following measures may be suggested :—

(1) All medical officers may be urged to make themselves gradually familiar with the necessary technique - a matter or no great difficulty, since a large number are already acquainted with it.
(2) Thorough practical instruction in this matter should be given in the medical schools in this country. Medical subordinates already in the employment of Government should be instructed as opportunity offers by the medical officers under whom they are serving.
(3) In localities where ankylostomes are prevalent, small, strongly - made microscopes of weak powers, suitable for the detection of the eggs of these and other intestinal worms, should be issued to all dispensaries. Such microscopes may, I think, be manufactured in Europe for the purpose, at the cost of about ten to twenty shillings each - possibly at a lower cost if ordered in large numbers.
(4) More powerful microscopes, provided with lenses suitable for the examination of blood, should be possessed either by all commissioned medical officers or by all hospitals, Civil and Military, where such medical officers are employed.

With reference to (2), I think it advisable to mention that during the course of my present studies I have come cross two medical subordinates in charge of dispensaries who, though many of their patients were then suffering from the worst degree of ankylostomiasis, informed me that they had never even heard of the disease. They certainly know nothing about it; were not acquainted with the microscopical method or detecting the worms; and no microscopes to use for the purpose; and were, in fact, treating these severe cases of the disease with tonics for "malarial cachexia". Similarly, I have generally found medical subordinates in this country to be quite insufficiently instructed in regard to tropical parasitology - that is, in regard to what are perhaps the most important diseases in the country. I venture to recommend that instruction in these matters should not only be theoretical, but should extend to the practical detection of the parasites by the microscope; and can vouch for it from personal knowledge that native subordinates are quite capable of doing the work if taught how to do it.

A more general use of the microscope, especially for the detection of intestinal parasites, is, I am confident, very urgently demanded in-tropical medicine.

I have not made these last recommendations lightly; carrying them out will involve some expense to Government and some trouble to medical officers; but it is difficult to escape from the fact that until they are carried out patients will have just cause to complain that they are not being treated by the best methods.

सत्यमेव जयते

SIMLA EXTENSION COMMITTEE, 1898 — REPORT[1]

JUNE 28, 1898

President	Mr. J.P. Hewett
Members	The Hon'ble Mr. J.S. Beresford; Colonel H.P. Leach; The Hon'ble Mr. L.W. Dane; Mr. J.E. Hilton; Colonel L.J.H. Grey.
Secretary	Mr. E. Ducane-Smithe

Appointment

The Simla Extension Committee was appointed vide proceedings of the Hon'ble the Lieutenant-Governor of the Punjab, in the Public Works Department No. 330 S., dated 28th June 1898 and the following letters which were communicated between departments of Punjab and Government of India:

(i) Letter No. 2623, dated 26th April 1898, from the Secretary to Government, Punjab, Public Works Department, to the Joint-Secretary to the Government of India, Public Works Department.

(ii) Letter No. 81, dated 9th June 1898, from the Secretary to the Government of India, Home Department, to the Secretary to the Government of India, Home Department.

(iii) Letter No. 214, dated 14 June 1898, from the Secretary to Government, Punjab, Public Works Department, to the Secretary to the Government of India, Home Department.

(iv) Letter No. 95, dated 21st 1898, from the Secretary to the Government of India, Home Department, to the Secretary to Government, Punjab, Public Works Department.

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[1] Punjab Government Branch Press, Simla, 1898, 128, lxp.

Terms of Reference

1. Whether it is desirable or possible to take any measures for preventing or limiting the extension of Simla.

2. If not, whether Simla is capable of extension, and if so, how provision can best be made to secure this object.

3. The best means of providing the station with an efficient and adequate supply of water, and of improving the existing sewerage and conservancy arrangements.

4. Whether the Municipal Committee can be expected to impose further taxation for the existing water-supply of Simla, and for the purposes mentioned in (3); if not, what suggestions can be made for the purpose of carrying out these improvements.

5. Whether there is any method by which the influx of unemployed persons into Simla can be regulated and controlled.

Contents

Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab appointing the Simla Extension Committee; Letter of the Secretary of the Simla Extension Committee submitting the Report. Expansion; Water-Supply, Sewerage and General Improvement. List of Annexures A to Q.

Recommendations

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Expansion

1. The first of the questions entrusted to us for investigation and report is the following :—

> "Is it desirable or possible to take any measures for preventing of limiting the extension of Simla?"

In view of the great difficulties which must always attend the efficient conservancy and sanitation of a station located in the hills, and of the great expense involved in providing an adequate water-supply for such a station, it is obvious that, where it possible, it would be desirable to restrict the further extension of a town like Simla which already, as will appear from the evidence of the sanitary experts and the map [No. 3 (in pocket).] submitted by the Municipal Committee, which are attached to this report (Annexure B), is in many places dangerously overcrowded.

2. Actual increase which has taken place since 1889 in the station.

The statement furnished by the Municipal Committee, dated 11th July 1898, which forms Annexure A(1) to this report, shows the number of houses and shops in Simla before the opening of the railway to Kalka on the 31st of March 1891 and those now in existence. It will be seen that the number of houses in the Station Ward and increased by 24 per cent. Over and above this actual increase in the number of houses, we have to face the fact that there are few houses in the station in which by additions or the erection of additional storeys, the accommodation has not been largely increased. Though the number of houses and shops in the Bazar Ward has not increased in the same proportion, the Municipal Committee point out that it is in the Bazar especially that the accommodation has been greatly increased by additional storeys, throwing out additional rooms, enclosing verandahs, &c. The sanitary experts who favoured us with their opinion unanimously consider that the main Bazar is dangerously overcrowded already, and particularly condemned on grounds of the public health and safety what may be described as the vertical extension of the Bazar by the erection of additional storeys to the existing houses. In this view we fully concur, and consider that no further extension, as distinguished from mere internal improvements in existing houses, should be allowed in the Main, Lakkar and Kaithu Bazars. As might be expected from the statistics as to the expansion of the house accommodation noticed above, the figures for the census of August 14th, 1898 [Annexure A (2)], indicate that there has been an increase of not less than 26 per cent in the population within the Municipal limits since the last summer enumeration in 1889. Thus the population then stood at 24,179 and now it amounts to 30,405 souls, an increase of 6,226. The detail of the distribution will be found in the annexure.

The Municipal Committee point out that for various reasons the present enumeration is probably under the mark, and that an addition of 4 per cent should be made to the total both within Municipal limits and the villages outside. The census too was not taken at the most crowded season, and it also does not include the whole of the floating population which enters and leaves Simla daily, for which provision must be made in any scheme for water-supply and sanitation. This, as shown in Annexure A (3), amounts to about 3,000 persons.

There is no reason to suppose that the rapid increase which has taken place in the population of the Municipality since 1889 will be retarted in the future. On the contrary, the great stimulus which was applied to building by the opening of the railway in 1891, and which is still actively operative, leads rather to the belief that the extension of that railway to Simla itself will perhaps be attended by even greater efforts on the part of existing house-owners and others to cover the land within the Municipality with buildings.

3. Reasons why it is impossible to prevent his expansion.

We consider, however, that it is practically impossible to prevent the extension of Simla for the following reasons.

Such an extension could only be prevented by legislation of a most drastic character. An absolute prohibition of the construction of the railway, or the imposition of taxation of an extremely abnormal and invidious character on persons visiting or residing in Simla, other than those on duty in the service of Government, might perhaps retard the increase of the Municipal population in future. It appears to us, however, that such measures are not within the scope of practical action. It is understood that the agreement for the construction of the railway has actually been signed, and the Company interested in the scheme will certainly have great cause for objection if such extraordinary measures are now suddenly taken to restrict and retard the normal growth of the town of Simla.

Similar and even more cogent objections apply to a forcible diminution of the existing population by the transfer of the summer headquarters of the Punjab Government to some other station, even if such a station existed in which room could be found, and if the transfer were not even to insuperable objections on the score of administrative convenience and economy.

Taxation of the character contemplated would of course be most unpopular, and it is more than doubtful if is could be imposed without abolishing or overruling the existing Municipal Committee. Legislation absolutely prohibiting the construction of buildings within the Municipal area would be evaded, and would be at any rate excessively irksome, and we do not believe that the Government would be willing to undertake the introduction of such measures.

4. Measures necessary to prevent overcrowding in the station.

At the same time we are of opinion that the existing powers of the Punjab Municipal Act as contained in Sections 92, 93, 94 have not been properly utilized in the past by the Municipal Committee with the view of preventing insanitary overcrowding. If it is a fact, as has been held by the Municipal Committee, that these sections do not give the Municipal authorities of Simla sufficient powers of preventing, without prohibitive expenditure on compensation, the erection or re-erection of building on sites objectionable from the point of view of the public health, comfort and convenience, as well as of the adequate forest conservancy of the hillside, we would recommend that the necessary legislative action should be taken at once to strengthen the hands of the Committee, and thereby prevent any further dangerous overcrowding and the construction of buildings upon unsuitable sites. The building rules also appear to us to be wanting in definition, more particularly in respect of the interval to be left between buildings, and we would suggest that the Municipal Committee should be asked to revise them. The rules of the Darjeeling Municipality *mutatis mutandis* as shown in Annexure F might be consulted as they seem to be suitable to the circumstances of Simla also.

5. Other steps requisite to secure control over the extension of Simla in the adjoining Native States.

To this extent therefore it appears to us to be not only desirable but absolutely necessary to take measures to prevent and limit the extension of Simla within the Municipality.

Settlement	*Population*
Sanjauli	747
Kasumpti	1,157
Tal	266
Barari	207
Budhai Ghat	392
	2,769

This, however, is not all that is necessary. The territories of the Native States of Patiala and Keonthal, with its feudatory Koti, immediately adjoin the Municipal area of Simla. The statistics given in Annexure B and the statistics given on the margin of the extra Municipal population as ascertained at the census of 14th August 1898, show that houses and bazars are springing up in the immediate vicinity of the Municipal area. So far as Patiala territory is concerned no great expansion of building has occurred, but this probably is because that territory only adjoins the Municipal area in the extreme west and north-west where there is no overcrowding. In Keonthal and in Koti the extra Municipal expansion of Simla has already attained considerable proportions. This expansion in the Chota Simla direction led to necessity to the acquisition of jurisdiction over all Kasumpti by the British Government from the Raja of Keonthal under the terms of the lease dated the 24th of October 1884. The circumstances which led to the execution of that lease are detailed in the note which forms Annexure C to this report.

6. Failure of arrangements made with Kconthal and Koti to prevent building near the Municipality.

Notwithstanding the distinct agreement on the part of the Raja that he would allow no one to build within the limit of one mile of the leased area, we understand that a house has been constructed by Mr. McGregor within that limit and that he proposes to construct two others. The sanction of the Deputy Commissioner was not obtained to the erection of the building.

Similarly, an attempt was made in 1894 to arrange by amicable and informal agreement with the Rana of Koti that no house should be built at or near Sanjauli without the previous consent of the Deputy Commissioner. In 1896 similar measures were taken in regard to the construction of buildings in Koti near Kasumpti. In both cases the arrangement proved a complete failure, and houses have been constructed and are being constructed in both places with the sanction of the Rana of Koti without any reference to the Deputy Commissioner whatever. There has also been a considerable extension of building beyond Boileauganj in Keonthal, and bazars and settlements are rapidly growing up in other places.

7. Measures are necessary to control this extra Municipal extension.

It is obvious that unless some steps are taken to check this extra Municipal expansion it would be useless to make measures to prevent an undue increase of the Simla population within the Municipal limits.

The residents of these houses and bazars derive all the advantages of the Municipal improvements without paying their fair share of the Municipal burdens. We therefore hold that, if it is desired to keep the expansion of Simla under proper control, it is absolutely necessary that powers should be acquired by the British Government to regulate and limit the construction of all buildings and to bring under proper sanitary control all the existing settlements within a reasonable zone surrounding the Municipal area.

8. View of the Committee that it is not possible to prevent extension, but that this must be controlled.

In short, as regards the first question, our view is that it is not practically possible, even if it were desirable, to absolutely limit or prevent the expansion of Simla, but that it is possible and that it is eminently desirable to take measures to control that expansion and keep it on definite lines which will not involve danger to the health or convenience of Simla.

9. How Simla can be extended.

The second point on which our opinion is asked is the following:—

> "Is Simla capable of expansion, and if so, how can provision best be made to secure that object?"

To some extent the answer to this question may be gathered from the preceding paragraphs. Such extension must be either internal within the Municipal limits or external. The Municipal Committee in their Resolution No. 12, dated the 15th of June 1898, which is attached to this report (Annexure E), have submitted their opinion as to how the extension of Simla can be effected. Subject to the following remarks our opinion is in accord with that resolution. The sites shown in the schedule have been inspected by us, and the results of that inspection were recorded in inspection notes.

10. Opinion of the Committee as to the extent to which expansion within the Municipality is possible. Size of building sites.

Briefly, our opinion is that building may well be permitted within the Municipal limits on the western slope of the hill between Prospect Hill and Summer Hill, on Summer Hill itself, and on the Elysium Hill, but to open up the sites on the last hill a new road is required as pointed out by the Municipal Committee.

There are also good sites in Government land on Jakko and in the Chota Simla direction where houses can be built without any objection on sanitary grounds. We, however, consider that any great extension of building on the northern slopes of the main range is open to serious objection from the point of view of adequate forest conservancy.

The lists of the available building sites prepared by the Municipal Committee are based on the assumption that an area of one acre is sufficient for each site. After taking the evidence of the sanitary experts we are of opinion that for detached houses constructed in the ordinary way, and on such sites as are still available, an area of one acre is insufficient, and that an area of at least 1½ acres should be considered to be the minimum for a building site.

Of course in the case of Clerks' quarters or other small buildings constructed with special regard to sanitary considerations and on duly sanctioned plans, so large an area will not be necessary, but such buildings must be dealt with specially and under due supervision after the plans have been approved by the Sanitary authorities.

11. Measures required to demarcate and record available sites in Government Lands.

Until a regular cadastral survey of the Government land is carried out it is impossible to say how many such sites are still available within the Municipal area, and we strongly urge that in connection with the proposed settlement of Simla measures should be taken at once to demarcate all available sites in Government land by a Committee which might consist of the Deputy Commissioner, the President of the Municipal Committee, and a Civil Surgeon, or the Health Officer. Sites so demarcated by pillars can be numbered and shown on a copy of the map on the scale of 24 inches = 1 mile, and a register of these sites should be kept in the District and Municipal Offices. The maintenance of such a plan and register will save trouble in the future allotment of sites, and will prevent the construction of buildings on unsuitable sites and the disputes as to the boundaries of private estates which are now common. We believe that about 54 such sites will be found to be available in Government lands, but this is only a very rough approximation based on the lists prepared by the Municipal Committee after eliminating sites considered by us to be unsuitable, and adjusting the figures on the basis of allowing 1½ acres for each site instead of one acre.

12. Building sites are also available in private estates and village lands and these should be recorded.

There are, however, also a considerable number of sites available in existing private estates and on the village lands within the Municipal limits. Thus it is understood that eight such sites exist in the Barnes Court estate alone. These sites, as well as other sites, in Government and private lands on Jakko, will at once become available if the proposed Upper Mall from the Church to the Convent is constructed. Detailed plans and estimates for this road have been prepared at the instance of the Punjab Government, and we consider that the work, which is estimated to cost Rs. 53,000, should be taken in hand as a very necessary public improvement, both with the view of the opening up these excellent house sites and to relieve the traffic on the main road to Chota Simla, which is apt to be very congested and so impairs the utility of that road as a public promenade.

A large number of sites suitable for Clerks' quarters and other houses for permanent residents can be found in the village lands of Bagog and Cheog below Squires Hall, which of course, if necessary, could be acquired under the Land Acquisition Act. It is impossible to say how many sites are available in private estates. We consider that during the course of the proposed settlement this point should be definitely set at rest, as above suggested, by the appointment of a Committee to determine where, and under what conditions, further buildings can be allowed in such estates. A register and plan of the sites held to be suitable should be kept on record in the District and

Municipal Offices for future guidance in dealing with applications for permission to build.

13. Extension of Bazar accommodation

Provision must also be made for the necessary Bazar expansion. This, for the reasons recorded by the sanitary experts, cannot be allowed in the existing main Bazar. There is room for some expansion in Boileauganj and perhaps in Chota Simla. But we believe that a fresh site for a new bazar, as well as for coolie lines, to which reference will be made hereafter, must be provided if dangerous overcrowding is to be prevented and the bazar requirements of the increasing population are to be adequately met. Such a site exists on the slops near Innes' Own, and it will be observed that the sanitary experts consider that the construction of bazar accommodation on this site is unobjectionable. It would be necessary to link up the coolie lines and the new bazar by a 12 foot path to the cart road near Boileauganj and under Combermere Bridge, and, if a tunnel is constructed through the Ridge to give access to the new road to Elysium, the new bazar will be centrally and conveniently placed, while it will probably be close to the terminus of the Kalka-Simla Railway. There is room for unlimited expansion of the bazar in this direction, and it may be hoped that by the utilization of this site the dangerous overcrowding of the existing bazar will be greatly relieved, if not absolutely stopped. The site is also very suitable for a large grain market, if the terminus of the Railway is placed in the neighbourhood. Other sites for coolie lines can doubtless be found below the Lakkar Bazar and in Chota Simla if necessary.

14. The extra Municipal settlement must be included in the Municipality.

It is obvious, however, from the history of the extra Municipal extension in the past that the sites available within the Municipal limits will be insufficient to meet the normal increase of the station. We therefore, agree with the Municipal Committee in thinking that the extra Municipal settlements shown in clause B of Resolution No. 12, dated the 15th June 1898, should be included in the Municipality. The areas in question are indicated on the map, which forms an annexure of this report, and have all been inspected by us, and we are strongly of opinion that the inclusion of each and all of these in the Municipality is absolutely necessary in the interests of the future health, safety and comfort of the town of Simla.

15. How this can best be arranged and reasons why the inclusion is necessary.

We, however, are aware that as the settlements lie without British India some legal difficulties may arise in including them within the Simla Municipality, but we understand that even without actually incorporating the areas in question in British India these legal difficulties can be surmounted, and that the Municipal administration of these tracts can be entrusted to a Committee identical in constitution with and working on the same lines as the Simla Municipal Committee.

At the same time there can be no doubt that it would be in every way preferable to definitely incorporate these areas in British India. Most of Kasumpti, as will be seen from Annexure C, has already been leased practically in perpetuity to the British Government, which has also acquired full jurisdiction over the leased area. The inhabitants of Kasumpti have, on two occasions, petitioned for the extension of a regular Municipal administration to that area. The Simla Municipal Committee are now anxious to include Kasumpti within the sphere of their direct operations, and we consider that the wish is reasonable and should be met.

Most of the area included in the tract called Tal has, it is understood, been given by the Patiala Darbar for the purpose of construction of a Gurkha institution, and it is desirable that such an institution, with the bazar and additional buildings which will necessarily grow up around it, should not be allowed to spring up within one mile-and-a-half of Viceregal Lodge except under proper sanitary and administrative control. The tract contains several excellent building sites, and is conveniently situated. We therefore, consider that, whether the Gurkha institution be built or not, this area should be included in the Municipality.

The extension of buildings on the east of Prospect Hill shows that may be expected in the immediate future, and as Budhai Ghat is connected directly with Simla by the cart road and is rapidly assuming a position of importance, the Municipal Committee rightly press for the inclusion of this area. It was always intended that Prospect Hill should be reserved as a public park, and to secure this object and the reafforestation of the southern slopes of the hill without the Municipality, as well as to adequately control further building operations, we hold that the limits of the Municipality should be extended so as to include the hill down to the cart road (*Note* : Where a road is indicated as the boundary a strip 100 feet wide beyond the road should for obvious reasons be also included.) on the east, Budhai Ghat on the south, and up to a line including the upper slopes of the hill from Budhai Ghat to Tawi on the west.

The insanitary settlement just below the Convent and the portion of the Convent itself which lies outside Municipal limits must now be included.

The other settlements are mere excrescences of the town of Simla, and should certainly be brought under Municipal administration, as experience of the past has shown in regard to Kasumpti, Sanjauli, and Barari that the Chiefs concerned are either unable or unwilling to carry out any form of sanitary supervision, or even to fulfil the agreements as to restriction of building into which they have entered with the British Government.

16. Further extension of the Municipal limits are necessary owing to the approach of the railway.

We also consider that in view of the approaching construction of the railway it is necessary to go beyond the proposals of the Municipal Committee in order to prevent the establishment of similar practical settlements just outside the Municipality. It is believed that the railway will probably approach Simla from the direction of the Downs below Kasumpti. We understand that from an engineering point of view it is immaterial from which direction the railway is brought into Simla and other considerations lead us to think that it will be desirable to bring it in at the Downs. These Downs form an excellent site for the construction of Clerks' quarters and a suburb of Simla, which, if the railway comes from that direction, will be in immediate and close connection with the Government offices and with the centre of the station. We therefore, recommend that the Downs should be acquired and included on the same terms as those on which the tracts above referred to are included within the Municipality.

In view of the experience acquired elsewhere as to the danger to be apprehended from the existence of insanitary or immoral settlements close to the boundary of British Municipalities and Cantonments, but not under the Cantonment rules or the Municipal regulations, we consider that it is desirable that a strip of land between the Municipal limit at Tawi and Jutogh Cantonment, bounded on the south by the Jutogh road and on the north by a line drawn approximately along the 6,500 feet contour, should be acquired from the Patiala State, and included either in the Jutogh Cantonment or in the Municipality as may be deemed convenient. This tract already contains several objectionable settlements, and also affords a fair number of sites suitable for the construction of barracks or houses in the event of an extension of Jutogh Cantonment, which may follow the construction of the railway.

Similar considerations of health and morality have influenced us in recommending the inclusion of the doubtful villages near Bishop Cotton School.

17. Explanation of the map showing proposed extension of the Municipality and the area over which it is considered necessary to acquire jurisdiction.

The boundary, which on a general consideration of the question suggests itself to us as suitable, has been shown in red with cross hatching on the map, (No. 2 in pocket) and has been drawn so as to include the areas above noted. As a further measure of precaution to give the British Government full control over the area adjoining the proposed extension of the Municipality, over certain ghats used by dhobis, and over the steam into which the main sewer discharges, we consider that explicit powers to absolutely prohibit, if necessary, the construction of buildings, if not full jurisdiction, should be acquired over the area lying between the proposed Municipal boundary and the streams leading from the sewage outfall and the Sanjauli tunnel to a pointed below Kasumpti. The small strip of Koti lying between Barari and the Municipal boundary should also be either included or be controlled by the Deputy Commissioner, as it may form a source of danger to the station. The protected area so defined has been shown in green on the map.

18. Possible further extensions and suggested reservation of the hill beyond Barari and of Tara Devi.

Beyond the proposed Municipal limit at Barari lies a large and fairly level hill shown in purple on the map which, if the proposed road to Petersfield is constructed, will be within easy distance of the centre of Simla. Unless measures are now taken, buildings will undoubtedly extend over this hill, and we recommend that an agreement should be obtained from the Patiala Darbar that no building should be allowed on this hill except with the sanction of the British Government.

It would be a still better arrangement it, in connection with the construction of the Kalka-Simla Railway, an arrangement could be made with the Darbar for the cession of this hill as a possible outlet for the further expansion of Simla, for which purpose it seems to us very suitable, in exchange for concessions to be made to the Darbar in regard to the alignment to be adopted by the railway, and we commend this suggestion the early and favourable consideration of Government.

It has been suggested that the Tara Devi hill might be utilised for the extension of Simla. We have been informed that the local water-supply on this hill is some 1,500 feet below the portion of it suitable for building sites. The cost of extending the Simla water-supply to Tara Devi would be prohibitive for the Municipal Committee, though the levels admit of this being done. We therefore, consider that no action is necessary in regard to this hill beyond obtaining from the Raja of Keonthal an absolute prohibition against building there without the sanction of Government. This will prevent a pirate settlement being formed there, and will keep the hill available in case it is ever required as a site for a cantonment. The hill is also regarded as a place of some sanctity by the people of the surrounding States.

19. Measures required to meet the case of the existing settlements on the Mashobra-Mahasu range.

We feel bound to point out, however, that even the measures indicated above will be insufficient for the expansion of Simla that may be anticipated in the future. We would draw attention to the fact that on the Mahasu-Mashobra range no less than 28 houses have already been constructed by Europeans, who in some cases reside permanently in these houses, coming into

Simla daily to transact their business. This range also already includes the Catchment Area of the Simla water-supply, and, as will appear from succeeding paragraphs, it will from the source from which any extension of that supply must necessarily be obtained. It is in every way suitable for the construction of a European sanitarium, and lies close to the water-supply, so there is but little doubt that in the course of a few years the whole range from the Toll Bar to Naldera on the west and Kufri on the east will be covered with houses.

For the reasons indicated in the preceding paragraphs, as well as those mentioned in the following paragraph, it appears to us that it is necessary, in the interests of Simla as well as in the interests of the house-owners themselves, that the area here shown in green on the map [No. 2 (in pocket).] should be included within the jurisdiction of British Courts and that British law should be applied to it.

Whether this result is to be attained by actual incorporation of the area in British India or by the acquisition of jurisdiction from the Koti Chief, is a matter which can only be decided by the Government, but we venture to recommend that at any rate jurisdiction should be at once acquired over the whole Catchment Area and over the whole range down to the limit to which buildings are likely to extend in the near future, which may be taken to be approximately the 6,500 contour in the Mashobra direction and the old road to Theog below Mahasu.

20. System of Municipal and Forest management suggested for the Mashobra-Mahasu range.

Most of this area lies in the Koti State, but there are small portions in Madhan and Patiala which can probably be readily acquired. It is too far away from Simla to be adequately controlled by the Municipal Committee, and it therefore appears to be desirable to entrust the administration to a Committee composed of the Superintendent, Hill States, the Executive Engineer in charge of the water-supply, and the President of the Simla Committee, which will ensure that the interests of the Simla Municipality are not endangered.

This measure is also necessary in the interests of forest conservancy, as there is some reason to believe that unless stringent measures are taken the forests here will be ruthlessly cut down and the hillside ruined as has been the case above Phagu.

To protect the future extension of the water-supply the existing agreements with the States concerned on the subject of forest conservancy must be strictly enforced as regards the area coloured purple on the map [No. 2 (in pocket)] to the north of Phagu, but we do not consider that, if good filter beds are provided and the land adjoining the springs is reserved, any further interference in this direction will be necessary.

21. Construction of the Mashobra-Suni road recommended as a means of regularizing the extension of the Mashobra station and as a feeder road for the railway and Simla.

With reference to the papers forwarded with letter No. 402, dated 2nd July 1898, from the Secretary to the Punjab Government, Public Works Department, we consider that the construction of a 12-foot road to Naldera and of a mule or camel road to Suni along the Mashobra range will greatly facilitate the regularization of this extra Municipal settlement, and will also act as a valuable feeder road to Simla and the railway. The Suket State has constructed an excellent road at a gradient of 1´ in 10´ to the Suni bridge, but there the graded road ends, and the present rack is an almost insuperable obstacle to the free development of the grain and fuel trade which may reasonably be expected if the route is properly opened, since a certain amount of grain, even as it is, manages to struggle into Simla. We consider that every facility for access to the town should be given to the trade of the hill tracts around Simla, as this already tends to keep down prices, and will always form a useful check on monopoly rates when the railway is opened. This route, which we have inspected, appears to be a promising line, and we therefore recommend that the construction of such a road should be taken up as soon as possible by Government, more especially as it is understood that the Rana of Bhajji is willing, and indeed anxious, to see the road opened up. The cost of a cart road from Mashobra to Naldera is put at Rs. 67,500 and the cost of such a road as is proposed will be considerably less.

22. Difficulties attending the extension of Simla in the Keonthal and Koti States.

As regards the areas to be acquired from the Keonthal and Koti States, in view of the past history of the case, it appears to us to be useless to attempt to regulate the future administration of the tracts which it is desired to include in the Municipality, or over which jurisdiction is sought, by an amicable arrangement of the former character with the Chiefs concerned. We are aware of the great reluctance shown by the British Government to make over British territory to a Native State in exchange for other territory to be ceded by that State. At the same time it appears from Annexure C that Simla itself owes its existence to such exchanges. We understand that, owing to their small extent, it is impossible for the Keonthal and Moti States to maintain in a proper form any regular system of administration. Courts and police do not exist, and as matters stand even at present complicated disputes between British subjects in regard to matters of considerable value may have to be submitted to the arbitration of these Chiefs who, from the peculiar status of the Hill Chiefs in regard to the land included in their States, are personally interested in the subject matter of the suit. It has come to our notice that such disputes have already occurred, and it is likely that they will be more common in future. It seems to us to be a matter for the early consideration of Government if such a state of things can be allowed to continue; and in the case of criminal proceedings in which British subjects are concerned it is obviously impossible to allow them to exercise unrestricted jurisdiction.

23. Suggestion as to the best way of acquiring the area required in these States for the extension of Simla.

We therefore, trust that we shall not be considered to have travelled beyond our proper sphere in recommending that, in view of these considerations, the acquisition of the tracts which it is desired to include within the Municipal limits should be accomplished by an exchange of territory either in Bharauli or in Kot Khai as has been contemplated on several occasions in the past.

We observe that the Raja of Keonthal was apparently willing in 1870 to take in exchange a portion of Bharauli as a *jagir* with magisterial powers, appeal being allowed to the Magistrate of the district. Possibly this proposal might be successfully revived in the case of Keonthal, and a similar arrangement suggested to the Rana of Koti, who has always asked for an exchange of territory in lieu of a cash rent. Annexure D shows that negotiations with this Chief have arrived at a deadlock, and some arrangement of this kind seems essential both in regard to the acquisition of jurisdiction over the Catchment Area, which we hold to be necessary, as well as for a basis for the further extension of British territory which in the future appears to be unavoidable. In view of the very indeterminate position of the Rana in regard to trees felled in the Old Catchment Area and the possibility of a claim against the Municipal Committee for half the value of wood from that area used for the pumps, it appears to be desirable to come to some definite arrangement as to this area without further delay. It is just possible that the Chief of Koti may consent to return the sovereign powers (which indeed he can only be said to exercise in a very restricted sense) into the hands of the British Government by which they were originally entrusted to him, and to assume the position of a *jagirdar*, such as the Rajas of Lambagraon, Guler and Nadaun in the Kangra District, in consideration of a reasonable grant of land on similar terms from British territory in the hills, whether in Bharauli or in Kot Khai. The Koti State is a very small one. It is being gradually but surely encroached on for building purposes and for the water-supply arrangements of Simla, and it may well be that, rather than see himself deprived of his ancestral lands altogether, the Koti Chief may be willing to allow himself to be mediatized in the same way as the smaller Cis-Sutlej States, and agree to the formal incorporation of his State into British India.

24. General result of the proposals for extending Simla.

These proposals, if accepted, will result in the increase of the area of Simla proper and Jutogh from 6.612 square miles to about 11 square miles, and to the increase of the area over which the British Government has acquired rights of user or jurisdiction, e.g., the leased area of Kasumpti with the one-mile building limit and the Catchment Area, from about 6 square miles to 14.803 square miles. These proposals may seem to involve an undue interference with the rights and liberties of the States concerned; but in view of the important interests involved, and of the fact that the population at present stands at over 5,000 per square mile, and will in the near future probably far exceed this, we do not believe, after careful consideration, that any measures less comprehensive than those recommended will be sufficient to meet the reasonable requirements of the normal and legitimate expansion of Simla which may be confidently anticipated when the Kalka-Simla Railway is opened. As far as possible we have endeavoured to exclude cultivated lands and village sites, but in places this has been necessary. The boundaries shown on the map are only rough approximations, and the actual demarcation of these on the spot must of course be done after careful consideration of all the circumstances of each particular case, which we were not able to give owing to the limited time at our disposal.

25. Opinion of the Committee as to how far Simla is capable of extension.

To sum up, we are of opinion that the answer to the second question must be that Simla is capable of extension both internally and externally, but that any further internal extension must be very carefully checked to prevent overcrowding and to facilitate the drainage and water-supply arrangements, and that, to secure a proper control over the probable external expansion of the town, measures must be taken to acquire in absolute sovereignty certain adjacent areas from the surrounding Hill States and to obtain rights of jurisdiction over certain other areas in those States. We also think that to meet the existing and probable needs of the town considerable improvements and extensions of the present water-supply and drainage systems are absolutely necessary, and some new roads must be constructed as will be explained in succeeding paragraphs.

Water-supply, Sewerage and General Improvements

(A) Water Supply

26. The third question referred to us was to report on the best means —

(a) of providing the station with an efficient and adequate supply of water,
(b) of improving the existing sewerage and conservancy arrangements.

It will be convenient to discuss these two points under their separate heads.

27. Before proceeding to explain in what manner the existing supply can be increased we think it would be well to describe briefly what it is and how it is obtained.

28. Gravitation project of 1877-78.

The first project, which was put in hand twenty years ago, was to provide the population of Simla, then about 16,000 souls, with a supply of 100,000 gallons a day brought in by gravitation from springs on the south side of the Mahasu range about 11 miles from the Church.

29. Pumping project necessary in 1891 to meet increase of population.

The springs were known to be likely to fall as low as 50,000 gallons a day in a year of extreme drought, but as this low discharge would not continue for more than 50 or 60 days it could be supplemented by storing in reservoirs. As a matter of fact the discharge, even after a winter of light snowfall like that of 1897-98, does not fall below 55,000 gallons a day, and the supply, backed up by the two reservoirs at Sanjauli and the Church, has come up to what the Committee of 1875 anticipated. A small experiment has been made in tunnelling at one of the springs, but it is not likely that the supply can be appreciably increased in this way. But with the rapid growth of Simla after 1880 this supply was soon found to be inadequate, and in 1891 a second scheme was taken up for pumping water a height of 1,200 feet from the bottom of the Charot nullah, which receives the discharges of the same springs that the gravitation supply taps higher up.

30. Supply available after 1893.

This installation was completed in 1893, at which time the population was taken to be about 25,000 and the daily supply in the worst period before the monsoon was thereby increased to about 215,000 gallons, made up this :—

Minimum from gravitation line	55,000	gallons
Drawn from reservoirs in 90 days	30,000	gallons
Pumped from Charot	130,000	gallons

There is besides a small supply available from the local springs, which may average 15,000 gallons a day, but we are advised that it is all suspicious and should not be used for drinking. A portion of it could be used for flushing and road watering purposes.

We observe that when the Government of India were asked to assist the Municipality in 1891 the daily supply from all sources was estimated at 282,000 gallons. The fact that the actual supply falls so far below the estimate shows that the figures which we furnish in our report may, since they are based on only one year's statistics, possibly be too sanguine.

31. Insufficiency of supply for present population.

For a population which including the floating population shown in Annexure A(3) now probably reaches 40,000 in the height of the season this total of 230,000 gallons is certainly not sufficient. It provides about 6 gallons a head of the population an amount which, according to received authorities, is a minimum allowance for domestic purposes only, and gives no margin for flushing sewers and street drains, watering roads, and so forth.

32. Dangerous consequences to be anticipated.

That the inadequacy of the supply has been felt by all the inhabitants of the station is not a matter to be wondered at, and there can be no question such a condition of affairs is a very serious thing; for in a place like Simla, where overcrowding in the Bazars has confessedly gone almost beyond safe limits, it is imperative that all matters connected with sanitation should be thoroughly attended to, so that the danger of the outbreak of epidemic diseases due to filth and bad drains may be guarded against as much as modern sanitary experience demands. Without plenty of water it is impossible to ensure general cleanliness of streets, drains, latrines and other similar places.

33. Necessity of remedying deficiencies.

It is believed that the general health of Simla has not so far suffered, but there have been some mild outbreaks of disease to serve as warnings that the sanitary condition of parts of the station is not in a satisfactory state, and these, coupled with the weight of the medical evidence given to us should make it abundantly clear that the daily supply of water must be largely increased to meet the demands of the existing population.

34. Probable population at end of present decade.

Previous experience of the rapid growth of Simla has shown how fast expansion takes place, and though many may hold that, even with the convenience of the railway, there will not be any large increase of population in the future, still we prefer to believe that the next decade will show a considerable further expansion, and that, in the matter of water service, the probability of having to find a supply for 60,000 people should be faced and a comprehensive scheme for a suitable quantity for a population of this number worked out. These figures include the population of Jutogh Cantonment to which it seems to us evident that the advantages of a good water-supply must eventually be extended.

35. Quantity of water per head that should be provided.

Bearing in mind the actual physical conditions of Simla experts will no doubt differ as to the allowance per head, for domestic and sanitary purposes, that should be provided for such numbers. Considering that the tendency now-a-days is to be more and more liberal in the matter of water-supply, our opinion is that wiliest 10 gallons a head might be accepted as a minimum for the next few years, it would be preferable to work up to a supply of 15 gallons, provided that this can be done at a reasonable cost. This would mean 600,000 gallons a day for the immediate future with the possibility of the demand being extended up to one million gallons at the end of the present generation.

36. Action taken by the Municipality.

The Municipal Committee have fully recognised their responsibility in regard to the water-supply and the necessity for increasing it. In 1896 the President (Colonel J. Robertson) addressed the Punjab Government, and asked that a project for a third reservoir on the pipe line at Saog which formed part of the original scheme of 1877 should be taken up, and also that other proposals for increasing the supply should be submitted.

37. Third reservoir at Saog.

An estimate was made out for the reservoir in 1897 and, with the consent of the Municipality, work on it was started this year. But in the interim the Engineers of the Public Works Department had worked out another and a much more favourable project for a second gravitation pipe line, along the lower slopes of the Mahasu hill, which would lead water to the Charot nullah pumps.

38. Lower gravitation pipe line. cf. letter No. 3-S. E. C., dated 27th July 1898.

The details of this scheme were put before us in a note by Colonel Jacob, R.E., Chief Engineer, and were considered to be so good that we had no hesitation in strongly urging upon the Punjab Government the advisability of the scheme being pushed on vigorously so as to be ready by next April. The Municipal Committee have fallen in with these views and have applied for a loan of 3 lakhs of rupees to cover the cost of the work.

39. Its favourable nature.

We strongly recommend that this lower gravitation supply should be secured at once, and that the cost of the estimate should be the first charge against the loan above referred to. It is anticipated that a supply of at least 140,000 gallons a day additional will be obtained at the pumps. The figures for the discharges of the streams this year will be found in Annexure H. They justify the assumption that 150,000 gallons a day can be averaged, of which 10,000 may be deducted for use in the boiler and condensers.

40. Necessity for providing a third engine and pump.

A third pumping engine at Charot is an essential part of the scheme, and every effort should, in our opinion, be made to have it in position and read to work by the 1st May, so that two engines may be in constant use and one in reserve. With a working day of 16 hours the engines would deliver 320,000 gallons, which is 50,000 in excess of the probable average supply, but the new pipe will be large enough to carry 200,000 gallons, so the engines will be able to take advantage of increased yield from the spring due to the thunderstorms of May and June.

41. Cost of lower line and Saog reservoir.

The probable cost of this lower line, with the additional engine and pump, is 2¾ lakhs. It will mean an increase of the supply from 215,000 gallons to 355,000 gallons. We recommend that any balance that may remain from the loan of three lakhs after full provision has been made for the lower pipe line should be devoted to the Saog reservoir. This project cannot possibly be completed by the 1st April next year, but while we might not perhaps have considered it a necessity for the present had the question of its construction been an open one, we think that it must, in view of the large sum already spent on it, be completed without unnecessary delay. We therefore, think that funds for its completion should be provided from the further amounts which will be granted after the loan of three lakhs already applied for. The estimated cost of the reservoir is 2 lakhs, and it will supplement the supply by 25,000 gallons in the dry season, bringing it up to 380,000.

42. Total reservoir capacity.

The reservoir capacity will then be 5,250,000 gallons, and the cost of supplying it is so great that it must be considered as much as it is economically expedient to provide even for such contingencies as possible break-downs of the pumps or a large fire in the Bazars.

43. Method of supplementing supply to the pumps.

The next essential appears to us to be to ensure that the pumps at Charot should never have less water brought to them than their working capacity, viz. 320,000 gallons. In the early part of the dry period the steams will always supply this, and also after showers, but there will occasionally be a deficiency of 50,000 to 60,000 gallons. (See Annexure J which gives figures of discharge in the *nullah* 140 feet below the pumps.) This can be obtained at a moderate cost by tapping the Charot nullah about 300 feet (vertically) below the pumping station and forcing the water collected back to the filter beds. A pump of '12 horse-power, which would only work occasionally and need not therefore be duplicated, would do all that is wanted, and with piping should not cost more than Rs. 25,000.

It might also be well to ascertain by experiment if the existing supply at the pumps cannot be augmented by catching in pipes the visible stream about ½ mile above the pumps before it disappears in the shingle bed of the nullah, as a portion of this may now be lost in the fissures of the rock before it reaches the weir at the pumping station. Something may also be done to improve the supply by small dams in the nullah itself.

44. Probable cost of doubling present water-supply.

For an additional expenditure then of 5 lakhs we see no difficulty in securing a supply of 430,000 gallons a day (double the present supply). This, though it may meet the requirements of Simla for some years, falls far short of the demands of the future.

45. The question of how best to meet these demands is not an easy one and has received our most anxious consideration.

We have examined the proposal to establish a second large pumping installation in the Charot nullah and to force water up in two lifts, but have felt ourselves compelled to reject it for the following reasons : - In the first place, it would be necessary to go a long way down the nullah to get the quantity required. Secondly, there would be difficulties about enlarging the present pumping station. Thirdly, pumping from Charot would not give water to Mashobra, the direction in which it is likely to be wanted in the future: and lastly, should it prove possible eventually to utilise the water power of the Giri, or of the Nauti Khad stream, the Charot nullah pumping stations would not be well situated. We consider that if further pumping should be necessary, it would be best to deal with the streams on the north side of the Mahasu range, both because the supply there is practically unlimited, and because the main bringing in the water must pass Mashobra, to which a service could easily be laid on.

46. Owing to the heavy cost of pumping by steam we investigated again the possibilities of bringing in a supply by gravitation from the Mattiana hill. The results of the observations taken were unfortunately very disappointing, the probable maximum supply in May and June available at a suitable level not exceeding 200,000 gallons a day, and this too was spread over a length of 5 miles, which would make it expensive to tap, and also to lead in, as the length of main would be about 25 miles. The hope of obtaining a constant supply of spring water by gravitation, even at a liberal cost, must, as far as it at present known, be abandoned.

47. But it may be possible to partially meet the case by making a rain-water storage reservoir. We inspected a site on the top of the Mahasu hill, which seemed to offer facilities for constructing a reservoir which would be capable of impounding 50 million gallons. The Punjab Government has accepted our proposal that experiments should be carried out to test the retentive quality of the clay and the run off of the catch ment basin. If the experiments result favourably, and the local Engineers decide that there is a good chance of the reservoir holding water without too much leakage, we would recommend that a project for it should be worked out, as the scheme would certainly prove to be a very economical way of giving water; for

if successful, it would obviate the necessity of any more pumping except in the dry season.

48. Owing, however, to the uncertainty that must attend the construction of a dam in hills such as those around Simla, whose stratification may be said in most cases to have been entirely broken up both vertically and horizontally on upheaval, we do not wish to pin our faith too much to the reservoir scheme. If it should prove successful it will be a very happy solution of the problem; but, on the other hand, as it may prove impracticable, it appears desirable to consider an alternative scheme.

49. We therefore think that in the meantime investigations should be put in train to examine the cost of putting up a pumping installation in a nullah on the north side of Mahasu. Observations of discharge of one stream, locally known as the Tikar-ka-nal, have already been taken. (See Annexure-L) These seem to promise good results, but require to be continued over a longer period and also to be supplemented by observations in other nullahs.

50. There can be no question of the possibility of bringing water into Simla from these streams, and the quantity that can be delivered will simply depend on the demand and the funds available at the time the demand arises. It will necessarily be an expensive process, as the water will have to be forced up from the bottom of a valley, and the expense is a double one, being both that of the first cost and also of future working and maintenance. By the conditions of the problem the demand will not arise until the population has increased, and increase of population means an increase of revenue of the Municipality. A full expansion of the water-supply up to one million gallons a day need not be contemplated as likely to be required for many years, but a considerable increase within the next five or six years should be accepted as one of the improvements that will have to be carried out. We therefore, think it necessary to put on record a rough indication of the probable cost of such improvements.

51. From the figures given in Annexure M it appears that the cost of the first installation of pumps to give 270,000 gallons a day, of which 50,000 might be allotted to Mashobra if the expansion of that suburb proves to be rapid, and the balance

passed on to Sanjauli, would be 7½ lakhs. This does not include the distribution of the extra supply in Simla or the pipes for the service of Mashobra. Two lakhs would not be too much to allow for these heads.

52. Should it ever be necessary to extend the supply a second pumping installation for 250,000 gallons additional could be established at a level of 5,200 feet. The cost delivered at Sanjauli would be about six lakhs, to which 1½ lakhs, the cost of extra distribution, would also have to be added.

The total cost of adding 520,000 gallons to the 430,000 shown in paragraph 44 would therefore be about 13½ lakhs for the pumps, mains, &c., and 3½ lakhs for distribution within Simla. These estimates are, in the opinion of the professional members of the Committee, liberal ones, but they do not include any charges for Public Works Establishment or Tools and Plant such as is customarily made when work is carried out by Government for a Municipality. We submit it for consideration whether, under the circumstances, such charges might not be foregone.

53. With this extension the working expenses would be extremely heavy. We understand that the present cost of pumping at Charot inclusive of establishment is 8¾ *annas* per 1,000 gallons, but this allows nothing for repairs. If allowance is made for repairs and renewals of machinery and for a possible increase of expenditure in fuel the cost will not be less than 13 *annas*. Considering the greater lead from Simla to the north side of Mahasu and the greater cost of the fuel, it is probable that, for pumping there, the cost will average nearly 15 *annas* per 1,000 gallons for the first installation and 23 for the second, i.e., the double lift. The working charges for 270,000 gallons therefore will be about Rs. 250 a day, and for the whole 520,000 Rs. 360 a day more, of which roughly two-thirds would be for fuel. The charges for pumping 320,000 gallons from Charot will be, at 13 *annas* per 1,000 gallons, Rs. 260 a day. The fuel hitherto used has been wood from the Municipal Forests, and a book charge of 6 *annas* a *maund* is debited to the pumping.

54. It is clear therefore that in the future when 80 per cent of the water consumed in Simla may have to be pumped at a possible cost of from Rs. 500 to Rs. 850 a day the Municipality will have to face enormous charges It is on this account that

the impossibility of deriving the whole supply by gravitation is so much to be regretted, and it is these figures that make out a strong case for the rain storage reservoir on Mahasu.

55. Probably it is the knowledge of these facts that has led to the rather vague suggestions made in the public press from time to time to utilise the water power of the Sutlej or of streams running into it to overcome the difficulty about the cost of pumping.

Our report would be incomplete if these proposals and others of a similar nature for taking water power, for electric lighting and other purposes, were excluded from the discussions contained in it.

56. As we thought it would be advantageous to go into the matter on the spot we visited the Sutlej near Sunni to see the configuration of the ground on either bank and to collect information about floods. We examined the river for a length of about 10 miles, and also had some levels run to give a general idea of the surface fall available.

The ground unfortunately does not lend itself at all to the excavation of a channel by which water could be led to turbines or water wheels. The river runs for the most part in a rockey channel cut out through a conglomerate from 100 to 200 feet below the comparatively flat cultivated area of a valley lying at the foot of hills from 4,000 to 6,000 feet high. Above the junction of the Nauti Khad stream there is no valley at all; the river runs for two miles in a gorge cut out of a limestone formation, and again below the suspension bridge at Sunni it has cut itself out a very narrow channel barely 100 feet wide in parts with exceedingly precipitous cliffs. This latter gorge extends nearly three miles. The contraction of the river at this point leads to a great ponding up of water in floods, the rise in exceptional floods being nearly 80 feet at the bridge, and this ponding up, which is felt at least two miles up-stream, complicates the question of fall that could be got by tunnelling out a channel in the conglomerate. There is at no point of the river where we examined it a good natural fall at which a drop of 15 to 20 feet could be obtained. The channel is one continuous slope at a fall of about 18 feet a mile with short rapids in a few places and no report of any marked fall anywhere along the river could be obtained. From the point of view of the Engineer wishing to utilize its power the river is distinctly disappointing. Even in America, where lavish use of money is freely resorted to overcome natural obstacles and disadvantages, it would be found a difficult and costly problem to obtain power in a situation like this, sufficient for the needs of a large town.

57. A dam above the suspension bridge gorge made with needles might be practicable, or the gorge there might possibly be blocked, but the most feasible and certain way of getting the necessary fall would be by tunnelling either through the conglomerate where the valley is wide, or through a gorge where a bend would give facilities for a cut-off. What the probable cost of such a tunnel would be it is not possible to say accurately until a detailed examination of the ground, and complete surveys of the river with levels of cold weather and of floods have been made, but enough information was collected to enable us to state that a tunnel capable of carrying water to give 2,000 net horse-power on a 30 feet fall could not be made with head-works and tail-race for less than 18 lakhs. The cost of turbines, generators, cable for transmission, transformers and other plant would be over and above this. In fact the works could probably not be carried out for less than 28 lakhs, exclusive of anything for distribution in Simla. This is about Rs. 1,400 per horse-power, which compares badly with the cost of similar schemes in Switzerland where £ 60 per horse-power is considered rather high. To pay working expenses and give 6 per cent on the capital the receipts would have to be at least two lakhs a year. The revenue would come from electric lighting, both public and private, and from power supplied for pumping water or other purposes. It is highly improbable that there would be a sale for lighting or power on such a large scale for many years to come; therefore, the practical conclusion at which we have arrived is, that unless a steady and large demand could ever be created for power in Simla it would be hopeless ever to think of utilizing the Sutlej, as the scheme must be far too costly to offer customer for power would be that the railway might find it economical to have part of their line equipped as an electrical tram. If the motive power required for cars by day could be used for lighting at night it is conceivable that some approach to financial success might be achieved, but this is perhaps looking too far into the future.

58. It will not necessarily follow from the abandonment of all idea of getting power from the Sutlej that a project on smaller lines on one of the other streams near Simla could not be worked out economically. The purpose for which power is most required and for which a certain market can be given is the working of the pumps of the water-supply. As stated in paragraph 53, the cost of running the first installation of pumps on the north of Mahasu will be about Rs. 250 a day, of which Rs. 166 would be for fuel. With a double lift installation the fuel would cost Rs. 570 a day, to which must be added Rs. 170 for the Charot pumps. In the immediate present we may anticipate that the Charot Pumps must run 200 days a year, and within five or six years the first set of pumps on the north of days a year, and within five or six years the first set of pumps on the north of Mahasu would have been set up and another 100 days pumping required there. The total cost of fuel then might be taken at Rs. 300 × 170 say Rs. 50,000 a year. If water power could be got to replace the engines at a cost not greater than five lakhs, it would pay to take it even for pumping ½ a million gallons, that five lakhs, it would pay to take it even for pumping ½ a million gallons, whilst it would pay still more to make use of it if ¾ million or 1 million gallons were ever wanted.

59. The most suitable location for such a power installation would seem to be in the Nauti Khad stream. The discharge in the dry whether is not accurately known, but by making a dam at some favourable point in the nullah, which is in places very narrow and precipitous, it should be possible to get enough water to give sufficient horse-power on a high fall to work the Charot pumps and the pumps of the upper lift on the Mahasu side.

60. We strongly recommend that this matter should be further investigated, and that data for forming a correct estimate of the water power available should be collected next year; the figures, with a survey of the stream, being placed at the disposal of some electrical engineering firms of repute, so that they might make a tender to the Municipality for carrying out the necessary works.

61. Our proposals about the water-supply may be summed up as follows :—

		Lakhs
First	Carry out the lower gravitation main to the Charot pumps. Probable cost	2¾
Second	Complete the Saog reservoir. Probable cost	2
Third	Establish a subsidiary pumping plant below the Charot pumps. Probable cost	¼
Fourth	Whilst the above are in hand investigate the possibi-lity of making a rain storage reservoir. Probable cost	4
Fifth	To simultaneously work out a complete estimate for an upper pumping installation on the north side of Mahasu. Probable cost	7½
	Should the reservoir scheme be successful it would not be necessary to resort to more pumping, at all events for another 10 years. But in any case either the fourth or the fifth schemes when completed will bring up the supply to over 650,000 gallons.	
Sixth	To work out the additional arrangements for distribution consequent on the adoption of the fourth or fifth proposal. Probable cost	2
Seventh	To investigate the possibility of utilising the water power of the Nauti Khad stream to reduce the heavy pumping charges of steam engines.	

62. This we consider such a comprehensive scheme that it must necessarily be left entirely in the hands of trained Engineers both to make out the estimates and to carry out the works. There are besides minor matters connected with the repair and maintenance of the existing water-works which must be attended to by the Public Works Department staff. Looking at all these facts, and considering the stake that Government, both Imperial and Provincial, has in Simla, both as a contributor to the cost of the water-works and as a tax-payer, we are emphatically of opinion that the entire control of the water-supply system from the head-works to the Sanjauli reservoir should be in the hands of the Punjab Public Works Department. We do not say this from any failure of the Municipality in the past to realise the responsibilities of their charge, but it is evident that neither the

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President nor the Secretary would have the leisure, if he had the knowledge, to supervise the work, and we have no doubt that the task of properly working and maintaining a system so varied and so large can only be safely entrusted to trained Engineers.

(B) The Sewerage System

63. The extension of the sewerage system is one of the greatest wants of Simla. This has been recognized* by the Municipal Committee for some time past, and they have again recently asked that the matter should be taken up by the Public Works Department. No doubt the chief reason that has prevented the earlier extension of the system has been the uncertainty about the sufficiency of water for flushing, but with the proposals now made for securing a more adequate water-supply this objection may be considered removed.

64. The existing system consists merely of four collecting tanks on the south side of the hill, one under the Foreign Office for Boileauganj end, one at Mayday Hill for the Chota Simla end, and two for the Main Bazar. Nine-inch pipes lead off from these soil tanks down to the valley below, known as the Lalpani nullah, the three branches meeting in one main just above the first water fall. The effluent sewage is allowed to find its way down the stream, mixed with what mater there is, and in a few places where the ground permits it is diverted on to fields by cultivators who are glad to use it. Above each soil tank is an iron flushing tank which can be filled from the water works main.

65. The sewage is carried by sweepers from houses all over the station and Bazar in large buckets, holding about eight gallons, to the soil tanks. On arrival there the cover of the tank is removed and the contents of the buckets 6 to 10 at a time poured into the tanks. The cover is replaced and a flush of water from a circular perforated pipe running round the top of the tank is then given. A valve is opened and the contents of the tank run off down the main. The buckets are washed out from a small stand-pipe on top of the tank, the water used for washing having had permanganate of potash added to it.

66. We inspected the working of one of the tanks and, though small improvements are necessary both in the details of

construction and in the method of flushing, we were on the whole satisfied with the general efficiency of the system. There was undoubtedly some offensive smell when the cover was removed, but this would not have been particularly noticeable at a distance of over 100 yards. The chief danger arises from the sewer gas that passes up the pipes, and when discharged finds its way up the slope of the hill above. The generation of gas from such foul pipes cannot be prevented, but it is the more important to insist on having a strong flush at least once daily, and the system requires constant supervision by experts.

67. The real drawback to the present system is that it is not extended enough to meet the requirements of the station. When it is remembered that there is no main for all the north side of the hill, and that back of Jakko has to be carried to these tanks, it is easy to understand how, notwithstanding the employment of an army of sweepers under liberal supervision, both European and Native, the carrying work is shirked as described by the Civil Surgeons, and the contents of the buckets only too often thrown down some out-of-the-way ravine.

68. We are of opinion that the best practical remedy for this state of things, is to multiply the soil tanks in such a way as to bring every house in the station within a reasonable distance of one. This will mean a quicker and more frequent disposal of the sewage and, with the supervision available, will ensure that it gets deposited in the mains instead of on the hillside. One of the greatest dangers to the health of the station will thereby the removed.

69. The measures we recommend for the extension of the sewage system may be briefly explained as embracing the laying of what may be called collecting mains running more or less along the contours of the hillside with a slope nowhere less than 1 in 50 and falling into the existing mains which lead down to the valley. These collecting mains will run as far as possible below the level of all houses and Bazars and above them at suitable points and levels a series of minor depots for sewage will be built with pipes leading into the mains. Each of these collecting mains will require a flushing tank at its head containing from 2,000 to 3,000 gallons according to its diameter. Sweepers will bring their buckets to these depots, and as they arrive the contents will be flushed off down the hill in batches of 4 to 6,

according to the area served by each depot. This system is the some that was adopted some years ago in Naini Tal and which has been found so far successful there as to be now under extension. It is simple to work, and it should prove equally suitable for Simla.

70. The position of the pail depots must of course be selected with great care so as to remove the nuisance of smell as far as possible from private houses. But with good flushing arrangements there is no reason why one of the pail depôts should be more objectionable than one of the many large latrines already in existence.

71. The only point on which we felt any doubt was whether the sewage of the northern slopes should be led down to the valleys in that direction that fall into the Sutlej or whether it should be led through the Ridge by a tunnel below Kennedy Lodge to the main on the south side of the station. The natural outfall would have necessitated a down main of at least 3 miles in length, in addition to the collecting mains, and it was accepted that it would be more economical to take the line through the hill.

72. The extensions described will in the first instance provide for the disposal of sewage only, except from the Bara Simla and Lakkar Bazars, but the collecting mains will be located so that connections for the removal of sullage can be readily made hereafter as funds become available.

73. No doubt private institutions, such as Clubs and Hotels, might take advantage of the possibility of making such connections as soon as the opportunity is given. Government also might do something in the case of clerks' quarters and public offices to make more perfect connections with the mains, but the greater number of houses must for some years to come be served on the lines of the existing system, only in a much more through and efficient way.

74. These sullage connections need not be expensive things. A large earthernware or metal pail, properly screened off, with a 4-inch trapped pipe leading straight down hill to the mains or one of the pail depots will meet all requirements.

We are of opinion that in the main Bazar such down pipes should certainly be established as part of the Extension Scheme in addition to the pail depots described above. The flushing water from the street drains that now passes off down the wooden shoots to no purpose, could be made use of our flushing these down pipes, and the branch pipes leading to the main sewers, thereby reducing the quantity of water that would be wanted to keep then clean.

75. The position of the existing soil tanks and mains is shown on the 8 inches to the mile map (No. 3 in pocket), and the proposed collecting mains are indicated by dotted black lines. The position of the pail depots is not given, as their location will be better left to be fixed by Municipal officers in consultation with sanitary and engineering experts.

76. It is most important to bear in mind that no pail depot or sullage basin should be built above the level of the water service. Good flushing is an absolute essential, if the depots are to be kept clean and free from objectionable smell. The head of water at a depot should not as a rule be less than 30 feet, so that the sweepers' buckets can be scoured out from a house discharging with some force.

77. The pattern of the depots in use at Naini Tal has been accepted as generally suitable for Simla, but in the case of depôts in or near the Bazars, it will, we think, be better to cover and roof them in, providing a ventilating pipe from the roof, with another from the down pipe leading up into it.

78. We would explain that the lines shown in the map (referred to in paragraph 75) are merely an indication of those we consider to be suitable for the extension of the sewage system. It was necessary to make some approximation to their alignment for the purposes of making a rough estimate of the probable cost. The details of levels and of lengths will be found in Annexure N, and are submitted in the hope that they may serve as a general guide for those who will have to carry out the work of the proposals recommended. The total length of new main and branches recommended is 60,000 feet, and the cost, including the accommodation reads required for inspection purposes and the cost of the tunnelling, will be five lakhs.

79. Every endeavour should be made by the agency employed in carrying out the scheme, to keep the pipe lines as much as possible within Municipal land, and when an existing road can be made use of to utilise it, where practicable. This will not only reduce the first cost, but will avoid complication and claims for

compensation from owners of private property if the track is taken through their estates.

80. We hope that, when the water service has been placed on a satisfactory footing, it will be possible to take up the question of connecting the public latrines in the Bazars with the collecting mains. The actual connections for this need not be costly, but it will involve a free use of flushing water and automatic flushing tanks at the latrines. By making improvements in the public latrines it may be possible to diminish the number of private latrines which are described as being in the most insanitary condition.

81. An ample provision of water for intermittent and continuous flushing (when necessary) will be absolutely essential for this extension of the sewage system. In discussing the matter of the water supply we have accepted an allowance of not less than 4 gallons a head as set aside for sanitary services. At present nearly the whole of this will have to be supplied from the water works main. This is a costly way of affording the supply, and every endeavour should be made to work out projects at reasonable cost for storing the supply from local springs or from storm water running off down ravines. The supply of the Combermere ravine spring will, it is understood, be diverted to this use by next year. Whatever can be effected in this direction will be worth doing for every 1,000 gallons of rain water, or from doubtful springs, will mean a *pro tanto* increase in the filtered water supply. A sum of one lakh of rupees has been entered as the possible amount that might be spent on these flushing water reservoirs.

82. It has been stated in paragraph 64 *ante* that the effluent sewage and flushing water passes straight from the pipe into the bed of the Lalpani nullah. We understand that hitherto no complains have been made by the inhabitants of the valleys of the Asni stream and of the Giri into which the Asni runs, of the contamination of the water in the nullahs, or of foul smells rising up from the streams to the villages. This is satisfactory to a certain extent, but it should be remembered that these particular valleys are not very thickly populated, and that the inhabitants are all the subjects of petty Hill States, and would probably be the last people to raise objections to anything being done by the British Government. It would be more in accordance

with modern sanitary practice if the effluent sewage were treated by a process of separation in tanks and then utilised in a sewage farm, and at least not delivered into the stream in its present crude form. We consider that this must be borne in mind as an improvement that may be forced upon the Municipality before many years have passed, and it would be well perhaps to take up the matter be times and see what land is available in the valley for a farm. Probably an area of 50 acres would be required.

83. The summary of our proposals for the extension and improvement of the present sewerage system is to the effect that collecting drains should be made gradually round all the hills and spurs which are not yet served by the mains, and that in connection with them and the old mains more collecting depôts should be made for carrying away the sewage both liquid and solid. Also that in conjunction with these new mains the water of local springs which must now be considered as too suspicious for drinking purposes, should be stored for flushing purposes, and that the feasibility of making reservoirs for rain water for flushing be also investigated. The total sum likely to be required in 6 lakhs, but the extension could be gradually introduced and spread over three years.

(c) General Improvements

84. With the allocation of new building sites on Government land throughout the station it will be necessary to undertake the construction of some new roads to serve the houses to be built, and we think it advisable to notice those that seem to us to be required. The expenditure which will be found detailed in Annexure O on the roads could also be spread over a period of three or four years, but a portion of any funds raised by loan or contribution should certainly be devoted to this form of improvement which is much wanted.

85. The most important of these roads is one on the west face of Elysium hill, starting from Cloverly, running under the Lakkar Bazar and Blessington to the road locally known as "The Lovers' Walk" that passes under North Bank. With improvements to this road through the Kaithu Bazar it could be continued on the north side of the main Ridge under Kennedy House of

Knockdrin, where it could join in to the road leading to Annandale. The proposed northern sewage main has been taken along part of this road which might have an even grade throughout of 1 in 50.

86. By making a tunnel 300 feet long under the Ridge at Knockdrin communication for carts and horsemen could be made direct with the cart road, and the new road towards Kaithu could also be eventually widened to take carts as far as the underside of the Lakkar Bazar.

87. With better communication with the trans-Sutlej States of Mandi and Suket and a further extension of the Mashobra suburb it may be necessary to make a cart road from Mashobra to Naldera, and, in that case, the link from the Lakkar Bazar to Mashobra could easily be made, such would give uninterrupted communication for carts from Naldera to the heart of Simla. This road to Sanjauli has also been suggested by the Municipal Committee as a means of relieving congestion of traffic on the present Mall. Traffic in the shape of timber, fuel, charcoal, grain and salt might be expected. For the present a road with a clear width of 12 feet will suffice with access by zig-zags to the Ridge from Blessington and to the Elysium road at Belvidere, with an improvement to the existing road at the Lakkar Bazar.

88. Another road that is recommended is from the Church to the Convent, running parallel with the Mall, but at a higher elevation round Jakko. It will not only be a convenience to residents of the houses above the Church and Lowrie's Hotel, but it will open up building sites in the Barnes Court estate and be an addition to the pleasant rides the station affords. It has been already estimated in detail by the Public Works Department, and its probable cost ascertained to be Rs. 53,000.

89. A third road that would be a great convenience is one starting from under the old Bandstand passing below Glenarm through Bairdvile and the Portmore Estate joining the Mall again just short of the Chota Simla Bazar. It could only be made with the consent of the owners of the different estates, but as it would improve communication to many houses from the Mall, it is possible that mutual arrangements to give the ground for the road might be made. It would be 5,500 feet long and would cost Rs. 30,000 to make.

90. The probable expense of building lines for coolies referred to in paragraph 13 would amount to about Rs. 100 per head or a lakh of rupees for 1,000 men. This would be enough to test the experiment of housing this class outside the Bazar.

91. It will be understood that the foregoing estimates of the cost of the extension to the water-supply and sewerage systems, additions to roads and other improvements are only put forward as suggestions and to enable an approximate estimate to be framed of the total amount of money which will probably be required to carry out our proposals.

Financial

92. The fourth and fifth questions referred to us for investigation and report were respectively - (1) Whether the Municipal Committee can be expected to impose further taxation for the existing water-supply of Simla, and for the purpose of improving the system of sewage and conservancy and, if not, what suggestions can be made for the purpose of carrying out these improvements: and (2) Whether there is any method by which the influx of unemployed persons into Simla can be regulated and controlled. It will be convenient to consider these two questions together.

93. The annual charges against the Municipal Fund on account of the repayment of loans are: (1) Rs. 14,000 on account of the Town Hall loan, and (2) Rs. 55,000 for the sinking fund on the consolidated loan from Government of Rs. 9,45,000, the amount now due on which is Rs. 8,15,890. The former liability will be extinguished in 1902 and the latter in 1922. The accounts of the Municipal Fund during the years 1896-97 and 1897-98 show an excess of income over expenditure of Rs. 6,379 in the former and a deficit of Rs. 10,806 in the latter. Some allowance may probably be made for the immediate growth of income as compared with expenditure and, with the advent of the railway, a considerable increase in the Municipal Fund may well be anticipated. But for the present, and probably until the Town Hall loan has been extinguished in 1902, it seems unlikely that the Municipal Committee will, if its sources of income are limited to those at present available, be able to devote anything substantial towards the repayment of a fresh loan.

94. The Municipal Committee have already applied for a loan of three lakhs of rupees, and are, we understand, prepared to apply for a further loan of three lakhs, provided that no portion of the interest and principal of the second loan is made repayable until after 1902. The amount which, according to our estimate, will have to be spent on improvements in the water-supply and sewage arrangements in Simla, and on subsidiary matters connected with the sanitation of the place is, if the scheme for the reservoir on the Mahasu range can be carried out, 20 lakhs of rupees; and if this proves not to be feasible and the water-supply has to be supplemented by pumping from the north side of the Mahasu range, 23½ lakhs. It is evident that taxation in the place cannot be increased to such an extent as to enable the Committee to raise this sum.

95. The sums spent on the water-works and sewerage system up to date have been —

		1878-1881 (Rs.)	1892 (Rs.)	Total (Rs.)
I.	Water-works	9,72,745	3,69,702	13,92,447
II.	Sewage works	2,00,000	2,17,636	4,17,636
	Total	11,72,745	5,87,338	17,60,083

This expenditure of Rs. 17,60,083 has been met by a loan of Rs. 8,25,001 taken by the Municipality from Government and by the grant of Rs. 9,35,082 from the State, of which Rs. 7,91,413 were contributed from Imperial and Rs. 1,43,669 from Provincial revenues. The presence of the Imperial and Local Governments at Simla has increased the responsibilities of the Municipal Committee to such an enormous extent that it appears to us that the Committee are entitled to expect that the State shall, as in the past, share with them the cost of the improvements that are now required.

96. The Simla Improvement Committee in their report of 26th November 1877 submitted their conclusions as to the extent to which the municipal income could be increased by additional taxation for the repayment of a loan. Their suggestions were that additional taxation to produce Rs. 41,000 a year should be imposed, and that Rs. 12,000 should be raised by

means of a water-rate. The population was at that time estimated at 18,000. The amount actually contributed under the present scale of taxation is Rs. 69,000. Before stating our conclusions as to the manner in which and the extent to which the Municipal Committee may now be required to provide funds for the repayment of loans, we propose to give some account of the discussions that have taken place as to the means of raising fresh taxes in Simla.

97. The Simla Improvement Committee of 1877 proposed to raise the sum of Rs. 53,000 above referred to —

		Rs.
(1)	By revising the system of calculating ground rent	3,200
(2)	By increasing the house tax from 5 to 10 per cent	16,500
(3)	By including in municipal limits the houses occupied by Europeans in the direction of the Kasumpti Bazar	1,500
(4)	By imposing a visitors' tax of Rs. 10 on every adult visitor, except (a) those unable to pay it and (b) casual visitors for less than 14 days	12,000
(5)	By a conservancy tax of Rs. 2 on every adult native, exclusive of workmen and artizans residing in the compound	8,000
(6)	By a water-rate at 5 per cent on the rental	12,000

98. The visitor's tax and water-rate were not imposed, but the ordinary municipal income, which had in 1874-75 been Rs. 45,000 had by 1878-79 when new taxation under heads (1), (2) and (5) and a frontage tax of Rs. 3 per running foot on all native shops in the Upper Bazar and Re. 1-8 per foot in all other localities were imposed, reached Rs. 1,36,350. The municipal income continued steadily to increase, and in the succeeding ten years had risen to Rs. 2,37,742. In 1884-85 the conservancy tax, which realized in that year Rs. 11,212 was abolished, as it was found out to be illegal, and in 1886-87 a servants' tax was imposed in its place, and a tax was placed on vehicles.

99. The question of increasing taxation by imposing a water-rate again came under consideration in 1891 when the proposals for extending the water-works and sewage schemes were taken up. The Municipal Committee, writing to the Deputy Commissioner on 31st March of that year, expressed their approval of a low water-rate, to very according to the proximity of the property on which it is levied to the nearest hydrant and to be a maximum for those who have water laid on to their

houses. They calculated that even if the whole working expenses of the water-supply were required, *viz.* Rs. 16,000, the rate would amount to an average of less than 2 per cent on the rateable house property in Simla including the Bazars. The Committee regarded the imposition of such a tax as certain to be unpopular among the residents of Simla, and refused to recommend any scheme involving further taxation as a means to supply the initial cost of the project then about to be undertaken. Subsequently, in their letter of 28th July 1891 they repeated their opinion that it would not be advisable or, perhaps, possible to impose a further burden on the householders to provide funds for carrying out the new works, though they admitted that it would probably be necessary to impose a water-rate to cover the increased cost of maintenance.

100. When the question of providing funds for the new works was before the Government of India in October 1891, they wrote to the Punjab Government expressing their opinion that a water-rate would be a perfectly reasonable form of taxation in Simla, and that, in examining the question of the future taxation to be imposed, the necessity for making the residents of the Bazars, as well as the unemployed inhabitants of private compounds, contribute their fair share towards municipal taxation, should be considered.

101. In December 1891 the Punjab Government requested the Committee to carefully review its financial position, and, as suggested by the Government of India, to arrange for the imposition of a water tax. In May 1892 the Government of the Punjab reported to the Government of India the conclusion of Sir James Lyall, that, as the taxation in Simla appeared from the Municipal Report for 1890-91 to fall at the rate of Rs. 13-8-6 per head, it would be impossible to adhere to the conclusion come to in December 1891 that the Committee should be required to arrange for the imposition of a water tax, if this conclusion were to be understood to refer to a water tax on buildings and lands generally under Section 44 of the Municipalities Act, and not to a payment for water laid on to private houses. The Punjab Government informed the Government of India that the Committee anticipated that Rs. 10,000 might be realized annually in payment for house connections, and also that they hoped to secure a small increase

of revenue by revising the octroi schedule. The Committee were considering the question of making the residents of the Bazar and unemployed inhabitants of private compounds contribute something; but these persons were stated to be mere labourers or paupers, and not much additional revenue was expected in this direction.

102. In replying to this communication the Government of India on 27th June 1892 observed that the rate of Rs. 13-8-6 per head appeared to have been calculated on the winter population of 13,034, and that, if the taxation (Rs. 1,76,366) realized in 1890-91 were distributed over the summer population of 24,179, it would not amount to more than Rs. 7-4-8 per head. The Government of India were inclined to think that additional taxation might properly be imposed in order to meet some portion of the cost of the two projects and their maintenance charges, and asked that the matter might be further considered by the Punjab Government in communication with the Municipal Committee. The Committee thereupon appointed a sub-committee to consider the question of imposing a water-rate and of making the residents of the Bazar and the unemployed residents of private compounds contribute their fair share towards municipal taxation.

103. The sub-committee's conclusions were —

(1) that in view of the existing rate of taxation (calculated by them on the figures for 1891-92 at Rs. 9-2-7 per head of the population) it was not desirable to impose further direct taxation;

(2) that when the water-supply project had been completed, house-owners or occupiers should be allowed, should they desire to do so, to connect their premises with the nearest main pipe, and that for this service a low water-rent, as distinguished from a water tax or rate, should be imposed at three rupees per cent in the Station Ward, and two rupees per cent in the Bazars and villages on the assessed annual rental value of dwelling houses, shops, stables and servants' houses so connected. They recommended that the rent for trades, for which municipal water is laid on, such as soda-water manufacturers, dyers, etc., as also gardens,

should be decided specially by the Committee according to the requirements of each case. They estimated that this water rent would produce an additional revenue of about Rs. 12,000 per annum;

(3) that a tax not exceeding Rs. 2 per annum, to be called a water and sanitation tax, should be recovered from persons not paying direct taxes themselves or in respect of whom no menial servants' tax is paid. They estimated the number of such persons at between 5,000 and 6,000 divided among —

(i) permanent and temporary residents in the Bazars, being lodgers, either in recognised or unrecognised lodgings;

(ii) casual residents in compounds outside the Bazars, being hangers-on of menial servants, or permitted, with or without the cognizance of the occupier or proprietor of the compound, to reside on the premises.

104. This proposal of the sub-committee was subjected to a trenchant criticism by six other members of the Committee on the grounds that: (i) there was nothing to justify their estimate of persons who would be liable to such a tax; (ii) that its incidence would be unequal; (iii) that it would eventually fall on those who already pay their full share of taxation; (iv) that it would be equivalent to taxing the wages of daily labourers; (v) that by restricting the supply of servants and labourers it would lead to a rise in wages; and (vi) that the bulk of the persons who would be amenable to the tax being extremely badly off there would be no effective means of realizing it from them.

105. When the matter was discussed by the full Committee they determined —

(i) unanimously to adopt the proposal of the sub-committee as to imposing a water-rate in due course; and

(ii) by a majority of five to four that it was inexpedient to impose any further direct taxation, a revision of the octroi schedule being all that was, in their opinion, required.

106. The question of a water tax again came under discussion in 1893 when the Punjab Government, in addressing the Commissioner of the Delhi Division, observed:- "A water tax upon buildings and lands under Section 44 of the Municipal Act, XX of 1891, would be in every respect a most proper tax already pay the highest rate of house and land tax allowed by the Act, *viz.* 10 per cent *ad valorem*, and are subject to ground tax besides, it might be felt as a Simla Rate-payers' Association, who seem to represent the class that would feel the hardship most, advocate a water tax, it may be a question whether it should not be imposed." In replying to this communication on 24th June 1893 the President of the Municipal Committee observed that "although a water tax might be in itself a most proper tax, it would, in the circumstances of Simla, be felt with hardship by certain classes of the community. Moreover, for a place like Simla, the introduction and working of such a tax would be specially difficult and complicated, having regard to the requirements of Sections 44 and 63 of Act XX of 1891." He pointed out that the difficulty of arriving at an equitable basis, upon which to assess such a tax, more especially with regard to the crowded tenements of the Bazars, was very great and almost impracticable, since a water tax would be payable by the occupier solely, and in the cases of the Bazar in which every house is *de facto* a lodging house, in Clubs, Hotels, lodging and boarding houses, and the like, it would be difficult to fix any individual occupier, of many such, with responsibility for the payment of a water tax.

107. The Punjab Government, on the 11th November 1893 observed, in writing to the Commissioner :—

> "As regards the water tax, having regard to the high rate of taxation to which houses and lands are already subject, Sir Dennis Fitzpatrick has been unwilling to propose it or press for it; but His Honor does not see that there would be any such great difficulty in assessing it as the Committee seem to apprehend, or at all events any difficulty which could not be removed by a small amendment of the Act, and, as has been already intimated in Mr. Maynard's letter No. 1970, dated 9th May 1893, he would be prepared to approve of it if the opinion of owners and occupiers of houses and lands

were generally in favour of it. But it is impossible to say from the representations which have been received that they are generally in favour of it; and accordingly pending some more conclusive expression of opinion in favour of this tax the only resource is an addition to the octroi."

We have received no papers to show that the question of a water-rate has been again considered between the Municipal Committee and the Punjab Government.

108. An important question that has of recent years caused difficulties is that of the taxation of buildings in the Bazars.

The taxes in force on house property and sites in Simla are as follows :—

(1) Ground tax on all estates within municipal limits at Rs. 10 per annum on a unit, or fraction of a unit, of 2,500 square yards by horizontal measurement, realized under Section 42(1)(A) (a)(ii) of Act XX of 1891.

(2) Frontage tax realized in the Bazars under Sections 42(1)(A)(a) (iii) and 209 of the Act as the following rates:—

Main Bazar —

		Rs.	A.	P.	
(a) Upper Bazar		3	0	0	per running foot
(b) Middle Bazar		1	8	0	per running foot
(c) Lower Bazar		2	8	0	per running foot
Boileauganj Chota Simla Lakkar Kaithu	Bazars	1	8	0	per running foot

(3) House tax realised on houses outside the Bazars, and in the Bazars, in lieu of frontage tax, on houses which stand apart from the frontage of Bazars, at 10 per cent on the annual rental under the authority of Section 42(1)(A)(a)(k) of the Act.

(4) The *Teh zamini* realized in the Bazars at one rupee per a varying number of feet in different localities, the number of feet being ascertained by adding the four sides together and dividing the product by 4.

The rates charged were —

Main Bazar	Shops,	Re. 1 per 6 feet
Lakkar Bazar	Houses	Re. 1 per 12 feet
	Shops	Re. 1 per 8 feet
Boileauganj Bazar	Houses	Re. 1 per 16 feet
	Shops	Re. 1 per 12 feet
Chota Simla Bazar	Houses	Re. 1 per 16 feet
Kaithu Bazar	shops and houses	Re. 1 per 12 feet

This letter tax seems not to be a municipal tax but a ground rent charged by Government, the receipts from which are assigned to the Municipality. It is a mark of the proprietary right of Government in the land.

109. The house tax is realized at the highest rate admissible by the law. The maximum rate of the frontage tax that can be imposed is Rs. 4 per running foot. This maximum is not reached in any of the Bazars. It has been often represented on the part of certain residents in the Bazars that the frontage tax was designed to act in the Bazars as the equivalent of the 10 per cent tax on the annual value of detached houses, but that, in many instances, it fell at a higher rate than 10 per cent on the annual value. It was admitted by the Municipal Committee that the incidence of the tax was unequal, tax-payers in many instances escaping their fair share of the public burdens, while others were relatively too heavily taxed. In 1893 the Committee proposed to the Local Government that the frontage tax should be abolished, the ordinary house tax being substituted for it; but that in order to avoid an estimated loss of Rs. 3,000 a year the ground rent of Rs. 10 per 2,500 square yards should be levied in the Bazars. The Lieutenant-Governor of the Punjab saw objections to the extension of the land tax to the Bazars, and in view of the fear that, unless the two proposals were sanctioned together, the Committee would lose considerably, the matter was dropped. The alleged inequality of the tax, however, led to the matter being referred in 1894 to the Finance sub-committee.

A suggestion was made that a frontage tax should be levied on all shops in all the Bazars at rates fixed for the different localities, and a house tax on all dwelling houses whether situated above or below the shops or standing apart from the shops. Another suggestion was that the present frontage tax should be abolished and a tax, calculated at a certain sum per cubic foot of the premises, substituted for it. Both these suggestions involve an amendment of the law. Eventually, in April 1895, the full Committee determined to postpone the question of modifying the existing system of taxation in the Bazars indefinitely. The question has come under the consideration of the Committee in the present year, and the substitution of the house tax for the existing frontage tax in the Bazar has, we understand, again been suggested. It is anticipated that this would lead to some reduction in the amount of the tax; but, on the other hand, it may be that if the frontage tax is retained as it is the Committee may feel themselves obliged to grant further remissions from it. This was their practice until 1894 and, if it has again to be resorted to, it may result in a serious diminution of the municipal income from this source.

110. Having given this explanation as to the nature and incidence of the frontage tax, we proceed to state our opinion as to the imposition of a water-rate. We are of opinion that such rate should be imposed on all houses situated shows that it has generally been admitted that such a tax is proper in itself and suitable for the circumstances of Simla. The objection to it has been that its imposition would be resented because of the high rate at which direct taxation already falls in the Municipality of Simla. The direct taxation for the year 1897-98 amounted to Rs. 1,47,633, which is a little less than Rs. 4¼ per head on an estimated population of 35,000. It must be admitted that the rate is high, but, on the other hand, it is essential, if the station is to remain healthy, that an adequate water-supply should be furnished, and a thoroughly efficient system of sewage and conservancy maintained. These are both matters of great difficulty and expense in a town of the situation and configuration of Simla, and they cannot be provided without imposing taxation at a rate which would seem excessive in a town in which such extraordinary difficulties are not encountered. It is incumbent on the Municipality at least to contribute towards the cost of the improvements which we have recommended, but no contribution can be provided unless the present system of taxation is raised and some additional direct taxation imposed. The least objectionable form of direct taxation is a water-rate. The Committee of 1875 advocated a water-rate on European houses of 3 per cent on the annual rental, and one of Rs. 5 per house

in the native Bazars. They estimated that the former of these rates would bring in Rs. 11,000 and the latter Rs. 3,500 a year. The Improvement Committee of 1877 apparently contemplated the rate being realized at 5 per cent on the rental of European houses only, and estimated the income from it at Rs. 12,000. The water-rate which the sub-committee proposed in 1892 on houses which were connected with the main pipe was 3 per cent on the assessed annual rental in the Station Ward and 2 per cent in the Bazars and villages. The amount of water-rate realised in 1897-98 from owners who have voluntarily connected their houses with the water-supply was Rs. 5,586 and this was calculated at 2 per cent on the rental.

111. We think it very desirable that every house in the Station Ward should, where possible, be connected with the water-supply, and in every case in which this is done be supplied with a metre. This measure should prevent waste of water and would also obviate the necessity for employing and paying bhistis, and tend to reduce the overcrowding of the place. It would be impossible to close the hydrants in the Bazars, and, so long as water comes into Simla at the present level, to connect all the houses on Jakko with the water-supply. But it appears to us that it would be feasible and desirable to insist on house connections in all other parts of the town. We would propose that the rate per cent on the annual value of those houses which cannot at present be connected should be 2 per cent, and that on those houses which are connected it should be 3 per cent. We think it desirable that legislation should be undertaken to compel owners to connect their houses with the hydrants where this is possible. Under Section 44(1) of Act XX of 1891 the rate must at present be recovered from the occupier; but even if legislation to compel owners to connect their houses with the water-supply is not resorted to, occupiers will doubtless be able to bring pressure on their landlords to have connections made. In order to assist them in doing so, we recommend that a penal rate of 5 per cent on the annual rental should be imposed in the case of houses which can be but are not connected. The payment of water-rate at the above rates would, we estimate, result in an income of about Rs. 22,500 less the Rs. 5,586 realised from water-rate in 1897-98, or about Rs. 17,000 net. We suggest that the amount of water which can be consumed for this payment

should be settled for each house according to the amount paid in water-rate, special arrangements being made in the case of large houses, the residents in which are few in number. For any water consumed in excess of the amount permissible on payment of the water-rate a surcharge should be made.

112. We have abstained from recommending a water-rate on the above lines in the Bazars, not because we think that the inhabitants of the Bazars should be exempt from being taxed for the use of water, but because the difficulties of assessing a rate on the annual value of the buildings in the Bazars are, in our opinion, insuperable. House tax has, under the law, to be assessed on houses situated in the Bazars not standing in a regular street or line of shops, but it appears to us to be impossible to make a full or correct estimate of the annual value of such houses, and that there would be, if possible, even greater difficulty in assessing the annual value of houses situated in a regular street or line of shops. This opinion is not in accordance with that held from time to time by the Municipal Committee, but in the only instance in which a house tax on the annual rent has been substituted on a large scale for the frontage tax, *viz.* in the Lower Bazar, the result was a considerable decrease in the existing taxation, and it is admitted that the great majority of the houses in question are under-assessed. While we see no alternative to retaining this house tax in the Lower Bazar, we think that steps should be taken to revise, as far as possible, the admittedly inadequate assessment of 1894. But we consider that the difficulty of properly fixing the annual value is fatal to the idea of substituting the house tax for the frontage tax in the Bazars generally. In the case of houses in the Upper Bazar with frontages on the Mall, many of which are leased to Europeans, we think that there are adequate materials for estimating the annual value and, while we would propose that the payment for water tax in the Bazars generally should be secured by revising the terms on which the frontage tax is levied, we think that an attempt should be made to levy house tax and water-rate on these shops.

113. The present rates of frontage tax have already been given in paragraph 108. The maximum rate imposed is Rs. 3 per running foot of frontage: the maximum which can be imposed is Rs. 4. We would recommend that the following rates should be imposed in future :

	Rs.	A.	P.
Upper Bazar	5	0	0
Middle Bazar and Lakkar Bazar	3	8	0
Lower Bazar and Lower Lakkar Bazar	2	8	0
Chota Simla and Boileauganj Bazars	2	0	0
Kaithu Bazar	1	8	0

One of the chief causes, if not the chief cause, of the unequal incidence of the frontage tax appears to us to be that a single storeys house is taxed at the same rate as one with as many as four or five storeys. We are advised that the overcrowding by raising additional storeys is as objectionable, from a sanitary point of view, as that by increasing the number of houses in the Bazars, and we think that houses in the Bazars should be taxed according to the amount of air space, as well as according to the frontage, which they occupy. We would, therefore, recommend that an elevation tax of half the amount of the frontage tax should be realized on each storey above or below that on which the frontage tax is levied. Legislation will be necessary to legalize this tax. We have no means of estimating accurately what additional income will accrue from the revision of the frontage tax and the imposition of an elevation tax, but we anticipate that it should not be less than Rs. 10,000 a year. Such a tax should not, in our opinion, be unequal or inequitable in its operation, as houses in the Bazar Ward not standing in a regular street or line of shops are already not liable to the frontage tax but to the 10 per cent house tax.

114. The Simla Improvement Committee of 1877 recommended the imposition of a visitor's tax at the rate of Rs. 10 per head on every adult visitor, except (a) those unable to pay it and (b) casual visitors for less than 14 days. The proposal was never carried into effect, but we are not aware of the reasons which led to its being discarded. A tax of this nature seems to us to be eminently fair in principle; but it should, we think, be realisable from the casual visitor as well as from others. The Simla Municipal Committee have to incur expenditure extending over the whole year on account of a season which only lasts for seven months, and this class at present escapes contributing in any material degree towards the taxation necessary to meet this expenditure. The tax would be of the same nature as that which is ordinarily levied at

Continental watering places. But we fear that it would be found very difficult to provide for the proper realisation of a visitor's tax in the manner suggested by the Committee of 1877, and we think that the best plan would be to impose this tax in the form of a toll on arrival at Simla. We would, therefore, propose that Rs. 3 should be realised on every express tonga, and Re. 1 per seat in every ordinary tonga, and Re. 1 on every ekka arriving in Simla. We recommend that the toll on the express and ordinary tongas should be realised by the Postal officials at Kalka when giving tonga tickets, and that on ekkas should be realized at the toll-bar at Dharampur or leasted to a contractor as may be found most convenient. The number of express phaetons and tongas arriving in Simla in a year is believed to be not less than 2,500, and we anticipate that this tax should bring in not less than Rs. 10,000 a year. When the railway is opened, the tax could be levied in the form of a charge on each ticket, Re. 1 for 1st class, 12 *annas* for 2nd, and 4 *annas* for 3rd. We do not consider that it is necessary to attempt to levy a toll of this character from passengers getting to Simla on foot or riding or travelling by bullock train or on a bullock cart.

115. A licence fee of Re. 1 per head has been charged upon job porters since 1892 for permission to work as coolies, messengers, &c., at rates fixed by the Municipal Committee. The receipts from these license fees amounted in 1897-98 to Rs. 2,056. We are informed that the earnings of a job porter are very considerable, and that the effect of giving these licences has been to increase the difficulty of getting jhampanis for private service. We are of opinion that the licence fees should be increased. A reasonable increase would not, in our opinion, affect the supply of labour, and the charge is not a tax on labour but a licence fee for a monopoly. The present charge for a license might be revised in one of two ways: either by doubling the license fee for the year, or by fixing the fee at two ways: either by doubling the license fee for the year, or by fixing the fee at 4 *annas* a month. If the former plan were adopted, the receipts from these licence fees would be increased by about Rs. 2,000, but the latter alternative, which has the obvious advantage of taxing the licensed porter in proportion to the period for which he gets employment in the place, would probably give a considerably higher increase. We therefore recommend

it in preference to the former. We are of opinion that the increase in the license fee should not be accompanied by any increase in the rates now chargeable by licensed porters, which appear to us to be quite suitable.

116. In connection with this question we have considered whether it is not desirable to adopt some measures for regulating the employment of jhampanis engaged in drawing rickshaws. We think that measures of this kind are very necessary, and we would propose that every rickshaw-man, whether in private service or not, should be required to take out a license. We think that the amount of this license for licensed pliers for hire may be put at double that payable by job porters. We recommend that private jhampanis should be licensed each month at a charge of 4 *annas*, the existing servants' tax on them being abolished. Their names should be entered in a register to be kept up in the Municipal Office and their licence withdrawn in the event of their being guilty of serious misconduct or concerned in boycotting.

117. We also recommend that a license fee of 8 annas per mensem be realised from artisans of all classes, and of 4 annas per mensem from the followers of menial callings who are not in private service. We make this proposal not so much with the object of enhancing the municipal income, though it will undoubtedly do so, as with that of enabling the Municipal Committee to exercise supervision and control over this class of persons.

118. We have considered the question of the revision of certain items of the octroi schedule. This form of taxation is particularly suitable in Simla since it cannot, except to an inappreciable degree, operate as a transit duty, and only a very small proportion of the amount collected can ever have to be refunded. The receipts from octroi amounted in 1874-75 to Rs. 11,194. By 1880-81 they had risen to Rs. 37,145, and ten years later to Rs. 52,181. The schedule was revised in 1893-94, and by 1896-97 the receipts had risen to Rs. 87,275. They fell to Rs. 80,977 in 1897-98. The schedule at present contains many articles which are liable to customs duty under the Indian Tariff Act, and ought, therefore, under the general orders of the Government of India, to be excluded from the schedule, and we understand that for this reason and also because the increase

suggested would fall entirely on the European inhabitants of the Municipality, the Government of India declined, in 1894, to agree to the enhancement of the octroi on wines and spirits. We also learn that the Government of India have made a general inquiry into the question of the taxation by Municipalities of articles which are liable to customs duty. We venture to recommend that, whatever may be the decision on the general question, the Simla Municipality should not be required to remove from its schedule articles which are subject to Imperial taxation. The circumstances of the place are such that the municipal taxation of these articles does not trench on Imperial taxation. Wines, spirits and other articles liable to Imperial taxation have been for years taxed by the Committee with the special permission of Government, and the financial position of the Committee, in which the Imperial and Local Governments are specially interested, would be seriously threatened by the removal from the schedule of any of the items now contained in it. We think also that some other articles liable to Imperial taxation may be added to the schedule, and we trust that the Government of India will agree to this as well as to the retention of similar articles already in the schedule. The enhancements and additions which we would propose in the schedule are appended in Annexure P. We estimate that if the schedule is amended in this manner, the increase of income should amount to at least Rs. 20,000.

119. We understand that the Municipality are about to employ an European to supervise the collection of octroi, and we are of opinion that improvement in the supervision of the collection is urgently called for. We also desire to express our opinion that while the system, under which consignments are permitted to pass the octroi posts and to be delivered at once to the consignees, the latter being subsequently asked by postcard to declare the contents of the consignments, is suitable, and in fact necessary, in the case of personal luggage carried in tongas, ekkas or a passenger train, it is absolutely unsuitable to the case of consignments imported otherwise and especially to those imported by traders. We consider that arrangements should be made to have the consignments of traders and all baggage and other property arriving by cart, bullock train or goods train, detained and the duty paid before the consignees

are permitted to obtain delivery. The establishment of a bonded-warehouse for this purpose would, we have no doubt, lead to the receipts from the octroi being materially increased. We understand that parcels received by the parcel post escape octroi taxation. We think that arrangements should be made by the Post Office to assist the Municipal Committee to realize octroi on goods arriving in this manner. Octroi is not now realized upon articles required for Government purposes, even if they are imported by contractors. We would represent that the exemption of Government stores and the like from octroi in Simla is not justifiable, and we recommend that octroi be in future realized on them. If these subsidiary suggestions are adopted, we think that there should be a substantial increase in the realisations from octroi apart from that which will result from the enhancements in rates and additions to the schedule which we have proposed.

120. The Municipal Committee have quite recently adopted a bye-law for the regulation of cattle byres belonging to milk-vendors. They are in favour of imposing a tax on milch cows and buffaless whether in the possession of private owners or milk-vendors. We approve of this proposal, but think that the tax on these animals should be the same as on a pony, *viz.* Rs. 4. We are not in favour of taxing perambulators or go-carts as proposed by the Municipal Committee.

121. Section 39(1)(A)(b) of Act XX of 1891 authorizes the imposition of a tax on persons practising any profession or art or carrying on any trade or calling in a Municipality. We have carefully considered the question whether a profession tax should be imposed in Simla. We think there can be no doubt that, while the Bazars do not contain as many wealthy men as area to be found in the Bazars in towns on the plains, there are a number of well-to-do traders among the native community who do not at present contribute their proper quota towards municipal taxation. The station has been called into existence by European needs and requirements, and but for them would never have existed. If the European community were to be removed from Simla the native community would at once disappear also, since it consists almost entirely of persons who have collected there in order to perform services for the European community and to make money out of it. It appears that about

75 per cent of the amount realised by direct taxation is paid by Europeans and Eurasians who compose only about 17 per cent of the population, and they also contribute far more than the native population towards the indirect taxation. We think that those who have settled in Simla in order to make their incomes out of the inhabitants by practising their professions or pursuing their trades might legitimately be taxed as a condition of exercising their professions or trades there, and we should have been glad had we been able to recommend a profession tax or some similar method of direct taxation which would have reached the more well-to-do trading classes of the Bazars. But we see great difficulty in assessing such a tax except as a double of the income tax, and we think that it would be difficult of assessment, unpopular, and liable to objection on the ground that it would trench on Imperial taxation. The amount of additional income which are Municipality would obtain under it would not, in our opinion, be sufficient to justify its being imposed in the face of these objections.

122. The question of restricting or regulating the influx of the unemployed into Simla has been considered by us in connection with the proposals which we have made in the matter of taxation. We think that the idea which seems to be generally prevalent that there is a large floating population in the place which escapes taxation altogether is in a great measure due to the feeling that the native community generally is not sufficiently taxed as compared with the Europeans. In his remarks on the census of 1889 Mr. Baines, the Census Commissioner, observed: "The occupation return shows about 2,334 adult women and 1,303 adult men either unemployed or entered under any indefinite heading. As for the rest, one-half the men are in domestic service or unskilled labourers, while it is only in the latter that women take an appreciable share. Taking both sexes together, 70 per cent support the remaining 30 (a high proportion of workers), and above one-third serve the rest, and another tenth labour generally for them. The rest of the returns speak for themselves and support in detail what is known generally, namely, that Simla consists 'of a European and Eurasian colony, mainly in Government service, the army or in commercial dealings supported by those classes', with a peculiarly large proportion of children, and that the native population is,

as a rule, attracted by the service of the colony, and not being permanently domiciled in the place, comprises a remarkably small proportion of women and children."

123. The sub-committee of the Municipal Committee, which was appointed to consider the question of taxation in 1892, reported that "there are at present at near as can be ascertained, and taking the figures of the census of 1889, between five and six thousand persons in Simla who pay no direct tax, or on whose behalf, either as members of a family the head of which pays taxes, or as menial servants no such tax is paid." We have been unable to ascertain how the sub-committee arrived at these figures, and we do not think that their statement correctly describes existing circumstances. The licence fee on job porters has been imposed since 1892, and in 1897-98 this was paid by over 2,000 persons, while servants' tax was paid on nearly 8,000 persons. That there is a residum of unemployed persons there is no doubt, but that it amounts to anything like the number stated by the sub-committee of 1892 we do not believe. We understand that, in 1897, the Municipal Committee at Mussoorie obtained permission to abolish the servants' tax and to impose a capitation tax of 4 *annas* per mensem per head on persons resident outside the Bazars, and 2 *annas* per mensem per head on those resident inside the Bazars. It appears to us that the objections taken on principle to the imposition of a similar tax in Simla can, in a great measure at all events, be answered. But in our opinion, if the proposals which we have made are accepted, the number of unemployed or unregistered persons resident in Simla will not be so great as to necessitate any further reconsideration of the existing system for taxing servants and licensing job porters, artisans, etc. There must, however, always be a considerable leaven of undesirable persons among the unemployed portion of the community, and it appears to us that stricter measures are required in order to reduce this class as much as possible. The police must be held responsible for the exclusion of gamesters, mendicants, and habitual thieves, and we are not assured that sufficient steps are always taken to rid the community of such persons. We think it desirable to represent that sustained efforts should be made with this object. And among the seekers for employment, especially as domestic servants, there are generally a number of persons of dissolute

or disreputable character. It would, we anticipate, discourage the resort of such persons to Simla, and also tend to stop the system of boycotting, which is often adopted when an employer is searching for a person to take the place of a dismissed servant, if the Deputy Commissioner or the Municipal Committee were to maintain a register of servants of good character and the public were encouraged to employ servants only through him. The community would by this means be rid of a number of objectionable hangers-on, and those of the public who engaged servants not entered on the register kept by the Deputy Commissioner would only have themselves to blame when they made bad bargains. We consider that no further steps could be taken to regulate or control the influx of the unemployed into Simla without interfering with the proper supply of labour.

124. To sum up our proposals as regards taxation, we think that the municipal income might be increased in the following manner :—

		Rs.
(1)	By a water-rate	17,000
(2)	By revising the frontage tax and the assessment of annual value in the Lower Bazar, imposing an elevation tax in the Bazars	10,000
(3)	By a toll on tongas and ekkas	10,000
(4)	By enhancing the license fees on job porters, artizans, &c.	4,000
(5)	By a revision of the octroi schedule	20,000
(6)	By tax on milch cows and buffalos	2,600
	Total	63,600

125. We estimate that the additional cost of maintenance of water-works recommended by us will for the next three years be not less than Rs. 20,000 a year. This reduces the amount of additional income, which will be available for the reduction of debt, to about Rs. 43,000 a year. When the Town Hal loan has been extinguished in 1902 Rs. 57,000 per annum would be available for the repayment of the loan necessary to enable the recommendations made by us to be carried out. By 1922 the whole sum of Rs. 1,12,000 would be available for this purpose.

126. The sinking fund necessary to repay a loan of 7 lakhs at 4 per cent repayable in 30 years is Rs. 39,482 and we are of opinion that the Municipality can afford to borrow 10 lakhs of

rupees repayable in 30 years, the period for which their present loan from Government runs, provided that they are required to arrange for a sinking fund only towards the repayment of 7 lakhs at once, and are permitted to defer any repayment towards the remaining 3 lakhs until after 1902, when the Town Hall loan will have been extinguished. The remaining sum necessary to improvements which we have suggested, *viz.* about 10 lakhs, if the scheme for reservoirs on the Mahasu range proves feasible, or 13½ lakhs, if it becomes necessary to pump water from the northern side of the Mahasu range, should, we consider, be given by the Imperial and Local Governments in proportions to be determined by them. We feel confident that if this expenditure be accepted and incurred now the necessity for further and greater expenditure in the near future will be avoided.

127. We have received from the President of the Municipal Committee a communication representing that, in the opinion of the Committee, the Punjab Municipal Act requires amendment in order to provide them with proper powers in respect of sanitary measures. The powers given under the present law have been proved by the Committee to be altogether inadequate. While we think that it would be beyond the terms of the order of reference for us to examine in detail the proposals made for amending the law, we trust that we shall not be considered to have exceeded our instructions if we express our conviction that if the Municipal Committee is to be held to be responsible for the proper observance of sanitary measures in Simla, it is essential that they should be given more stringent powers than are needed in places in which the physical and other difficulties which are met with here are not encountered. We therefore, commend the proposals of the Committee (Annexure Q) for favourable consideration. The amendments of the law advocated could be carried out simultaneously with those involved in our recommendations for the alteration of the frontage tax and for the levy of a water-rate, the provisions of the law regarding which are not at present satisfactory. The Municipal Committee have during the present season been assisted by a Health Officer. We understand that during the season the time of the two Civil Surgeons is almost completely occupied by hospital work and medical practice. We consider that unless it is possible to insist on their doing the work which would be required of a

Health Officer, a separate Health Officer should be permanently appointed in order to enable the Municipal Committee to properly regulate building and prevent overcrowding and to enforce sanitary measures. It would be essential that the Health Officer, if a medical man, should not be allowed to take any private practice.

128. We desire to bring the services of our Secretary Mr. DuCane Smithe to the favourable notice of His Honor the Lieutenant-Governor. He has been indefatigable in carrying out his duties, and we have been greatly assisted by him in coming to the conclusions which we have placed before Government.

INDIAN PLAGUE COMMISSION, 1898 — REPORT[1]

NOVEMBER 11, 1898

President T.R. Fraser
Members J.P. Hewett; A.E. Wright; A. Cumine; M.A. Ruffer
Secretary C.J. Hallifax

Appointment

The Commission was appointed by Resolution of the Government of India, No. 4360-74, dated 11th November, 1898.

Terms of Reference

The Commission was to enquire into the origin of the different out breaks of plague; the manner in which the disease is communicated; the effects of curative serum of Yersin and Lustig respectively; the effects preventive inoculation. Moreover, the object with which the commission was constituted to conduct an investigation on a scientific character.

Contents

Questions referred to the Commission and proceedings of the Commission; Account of Plague in India from 1896; Character of Plague, and the means by which the disease is communicated, and spread from place to place, Haffkine's Anti-Plague inoculation; Serum therapeutics of plague with special reference to the anti-plague sera of Yersin and Lusting; Measures for the Suppression of plague; Recommendations regarding the organisation of the sanitary department in India; (Appendices 1 to 5); Summary.

Recommendations

For the re-organisation of the Sanitary Department in India : The Sanitary Services should be recognised and that an Imperial

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[1] H.M.S.O., London, 1901, 540 p.

Sanitary Department should be established in India, somewhat on the lines which have been stretched below. The following questions are to the considered:

(1) The question of the present and future recruitment of the staff of the Sanitary Department.
(2) The question of the augmentation and strengthening of the present sanitary staff.
(3) The disposal and functions of the various members of the department.

It was proposed that the following might immediately be brought on to the permanent staff of the Department —

(a) The European Medical Officers of Health, who are at present in the service of the various Municipalities.
(b) The post of Health Officers of Bombay, Calcutta, Karachi, Madras and Rangoon.
(c) The medical officers who now hold appointments as Sanitary Commissioners and Deputy Sanitary Commissioners of the different Provinces.
(d) The bacteriologists who are now in the employ of the Indian Government.
(e) Civil Surgeons and their Assistants, in so far as they perform sanitary duties and the staff of Vaccination Department.

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With regard to the future recruitment of medical men for the permanent staff of the department, we would suggest that as the services of men of the class required, and that these appointments should be opened, on the one hand to officers of the Indian Medical Service who have gone through a special course of training and on the other hand, to other medical men who have special 'Qualifications in Public Health'. In the case of appointments from the Indian Medical Service, we would suggest that the appointments might, with advantage, be limited to officers or less than seven years' service, provided that before assuming duty they shall have studied Public Health in courses equivalent to the requirements for Degrees or Diplomas in Public Health.

We consider that the administrative department as thus constituted would urgently require to be strengthened by the appointment of a number of additional Medical Officers of Health. We would recommend that a special European Medical Officer of Health should be attached to every city in India which contains a population of more than 100,000 inhabitants. And in as much as the limit of population which a single Medical Officer of Health, is capable of supervising effectively may be fixed at 100,000 inhabitants. And in as much as the limit of population which a single Medical Officer of Health is capable of supervising effectively may be fixed at 100,000 inhabitants. We propose that in the case of cities one European Assistant Health Officer should be provided for every 100,000 inhabitants in excess of the limit specified above. We think that, while the Municipalities to which Medical Officers of Health may be appointed in accordance with our recommendations should provide for the salaries attached to the appointments of such officers and thin Assistants, their should not have the power of nominating to these appointments of that of removing officers who have been appointed.

Further, we would recommend that the staff of the Sanitary Department should be strengthened by the recruitment of a number of specially trained Medical Officers fill the various scientific posts which ought, in our opinion, to be created.

Again, it might be useful to include the Chemical Examiner in the staff of the Department in order to have available within it officers capable of conducting chemical analyses; but the duties which the Central Examiners have to perform in connection with medico-legal work may possibly be an obstacle to this being done.

We think that the Civil Surgeon in the Bombay Presidency should be given similar duties in respect of sanitary matters to there which are interested to the Civil Surgeon in other Provinces.

In order to assist the Civil Surgeon in his duties of Health Officer of the district, it is deniable than an Assistant Surgeon, qualified by his knowledge of hygiene, should be appointed in each district. This Assistant Surgeon could be employed at times in temporary charge of the hospital at the district headquarters so as to admit of the Civil Surgeon making tours of inspection in the interior of the district; and at other times the Assistant Surgeon could himself be engaged on the duty of making such towns. For these purposes men of special attainments and qualifications world be required, and we think that as a preliminary to their employment in the Sanitary Department, a certain number of them might be employed in the higher grades of what is now the Vaccination Department, where their qualifications and abilities could be tested.

In as much as the Inspectors and Superintendents of Vaccination have, under present arrangements, no medical qualifications and so special knowledge but that which they acquire in the course of their employment in the Department, we think that it would be of great advantage from a sanitary point of view to appoint Assistant Surgeons to the position of Inspectors of Superintendents of Vaccination. Under such an arrangement the work of Vaccination would not be less efficiently performed than hereto fore, while that of the Sanitary Department would be materially improved.

With regard to the disposal of the staff, it follows from what has been said above that the various members of the Department should fill the posts (a) of Medical Officers of Health to the larger cities, (b) of Medical Officers of Health to the various sub-divisions of each Province or Presidency, (c) of Port Health Officers to the various large ports, and (d) the administrative or supervising officers. In addition, we propose that a certain number of members of the Department should be employed on scientific investigations in connection with important questions of Public Health; and the President proposes that a certain number, also, should be employed both in scientific investigations and in the teaching of Public Health, as explained in paragraph 754 below.

We have already, in connection with the consideration of the influence of insanitary conditions on the severity of plague epidemics in India, adverted to the fact that the condition of many of the dwelling houses in the large towns in respect of over-crowding and in respect of structural defects is such as to make a healthy existence in them practically impossible. In connexion with the duties of Medical Officers of Health of large cities, such as Bombay or Calcutta, we would particularly emphasise the importance of exerting a sanitary control over lodging-houses for the prevention of over-crowding. We are of opinion that structural defects might slowly, but effectually, be remedied, at any rate in the larger towns, if the Medical Officers of Health were empowered to veto the errection or the rebuilding of grossly insanitary buildings within the limits of the Municipalities to which they were attached. The President, however, is of the opinion that the prevention of "over-crowding", in so far as this implies a limitation in the number of the occupants of rooms based merely upon their cubic capacity, can at present, have little beneficial result; for in the great majority of the dwellings, whether lodging-houses or not, a reasonably pure air would not thereby be secured, on account of structural defects and insanitary surroundings. He considers also that the remedying of the prevailing structural defects of existing buildings urgently requires attention, and that the measures which are being carried out with this object in Calcutta, Bombay and other cities and towns, should be continued and extended.

Another of the most important duties of all Medical Officers of Health, whether in the large cities or in the districts, will in our opinion be the duty of collecting accurate death reports. It ought to facilitate the introduction of sanitation into the villages and towns if provisions were made that weekly reports of death should in all cases be sent in to the Civil Surgeon as Medical Officer of Health for his district, with a view to their being carefully scrutinised in order that the existence of plague or any other epidemic disease may be brought to light. In the event of any serious mortality being detected by this method in the villages or towns, we think the authorities at the Headquarters of the Sanitary Department should be immediately informed, and that inquiries into the cause of the excess of mortality should be instituted without delay. For this purpose we think that the Assistant Surgeons whom we have proposed to attach to the vaccinating staffs might very appropriately be utilised.

Again, one of the most important of the functions which we would propose to entrust to the Medical Officers of Health (including Civil Surgeons acting in this matter under the directions of the Sanitary Department) in the duty of advising, with regard to all measures taken with a view of combating plague and other infectious disease. We consider that the functions of the Medical Officer of Health ought not to be limited to advising. We propose that the direct conduct of the operations which are undertaken should, so far as this does not involve an abduction of authority on the part of the Civil Officer, be entrusted either to the Municipal Health Officer or one of the Health Officers who are now styled Deputy Sanitary Commissioners, or to the Civil Surgeon in his capacity of District Health Officer. Where the local Medical Officer is, far any reason, unavailable for the duty, we suggest that another member of the Sanitary Department should be deputed to take charge of the operations.

In advocating that plague operations should be under the direct supervision of Medical Officers who are members of the Sanitary Department, we are advocating a definite departure from the practice of committing the conduct of plague operations to civil as distinguished from Medical Officers. We would, however, in connexion with this, pointout that what we advocate is merely that the practice which has long been adopted in connexion with the vaccination operations directed against small-pox in India should be extended to the operations which are taking place against plague and other epidemic diseases. We are convinced that in the case of plague, just as in the case of small-pox, efficiency can be secured only by placing the staffs and the general direction of the operations under the control of medical men who pessess the necessary technical knowledge. While we are convinced of this, we, as we have indicated above, do not fail to recognise that, just as a veto is reserved for the civil administrator in cases where the undertaking of vaccination operations may involve political or financial considerations, so it will, on both these grounds, similarly be necessary in the case of plague operations, and we recognised that the veto will be mere necessary in the case of plague than in the case of small-pox, where circumstances seldom call for its exercise subject to this necessary veto, and, of course, to the provision that the local Civil Authority must, with a view to exercising that veto, always be fully informed before hand of the exact nature and extent of the operations which it is proposed to undertake, we think, as stated before, that the conduct of the operations ought in all cases to rest with the Sanitary Officer.

Having the things which impressed us most in India was, the utter absence of a uniform system of dealing with a plague, and, secondly, the fact that very little the experience which was gained in one place was rendered available for use in another.

This absence of uniformity was seen not only in the case of general plague policy, but it was seen also, and even more glaringly, in connexion with matters a purely technical character. We have referred in our survey of the disinfection operations to the futility of many of the methods which were adopted and to the technical errors which were repeated over and over again in scores of different places. And this was necessarily so, for the officers in charge of the plague operations in each place had to work out for themselves a system of disinfection quite regardless of the experience which had been gained in other places. While we have nothing but admiration for the zeal and energy which was every where displayed, we are of opinion that there was much misdirection of effort. Now this could in large part be remedied by securing that the direction of plague operations, and in particular the direction of technical matters in connexion with those plague operations, should be placed in the hands of an Imperial Sanitary Department.

Mr. Hewett and Mr. Cumine do not concur with the above remarks. They do not agree with the recommendation made in this paragraph that the Medical Officer of Health of a Municipality or some other member of the Sanitary Department should, so far as this does not involve an abdication of authority on the part of the Civil Officer, invariably have the direct control of all measures undertaken to combat plague and other infectious diseases. They think it sufficient to point out that there may be - and in their opinion there after are – reasons which make it advisable to place in charge of the actual operations against plague an officer other than a Medical Officer.

So far as we have dealt only with the functions of the administrative as distinguished from the scientific branch of the Sanitary Service. The functions of this last branch are in our opinion not less important in their way than the functions of the administrative branch. To this branch would nationally be committed the bacteriological diagnosis of doubtful cases of plague or of other epidemic disease, the conducting of experiments to determine the effect of various disinfectants and to determine the mode of life and history of the various disinfectants and pathogenic agents, the mode in which these effects are entrance into the organism, and many other questions of similar nature. Further, there would naturally be committed to this Department, the manufacture of anti-plague and anti-small-pox vaccine, and of all other vaccines which may prove themselves to be effectual in the prophylaxis of disease. The effort of the Department might, we think, usefully be directed also to the endeavour to produce thoroughly effective sera for the therapeutic treatment of plague and other infective fevers and of make poisoning.

We think it might be well to concentrate the manufacture of vaccines and therapeutic sera and the special study of questions relating to these in a Central Institute of Public Health, which for climatic considerations ought, we think to be situated somewhere in the Hills, in a place readily accessible by rail. Without this the utility of a central laboratory would be curtailed in many ways. Such a central laboratory in the Hills would, however, not be available either for clinical research as far the study of the conditions under which pathogenic micro-organisms exist in the different parts of India. Neither would it, on account of the distances to which material would have to be sent, be available for the bacterial diagnosis of doubtful cases of disease in different parts of the country. We are therefore, of opinion that it is essential that Public Health laboratories should be established in the chief terms of each of the Presidencies and Provinces, and these laboratories ought, we think, to be equipped not only with a view to their being utilised for directly practical purposes, but also with a view to their being utilised for purposes of reach. These laboratories might with advantage be established in connecxion with the Medical Schools of the selected towns, where they would be utilised also for teaching purposes.

In the opinion of the President this utilisation of the Public Health Laboratories would greatly increase their scientific usefulness, while the efficacy of the teaching carried on in them would be enhanced by the association with research work. It was pointed out by the Committee that insanitary conditions exist in the rural as well as urban districts which urgently call for improvement. These conditions are in a great measure caused by want of information on the part of the people regarding the most simple and elementary requirements for healthy existence, with the result that, irrespective of deaths produced by infectious diseases, the general mortality from other preventible diseases is extremely high. Its native fractioners are brought into closer relationships, with the people than European practioners, the President, considering that they are thus more frequently in a position of give simple and elementary, but still valuable, instruction and advice to natives in matters pertaining to healthy existence, and being of opinion that the recommendation above made to employ Assistant Surgeons in sanitary work would largely depend for its success upon the thoroughness of their education in sanitation, deserves that it is where the Native Medical Practitioners and Assistant Surgeons are educated. This might, the President thinks, best we done, and thereby much benefit conferred upon the people of India, by—

(a) restricting the Public Health teaching appointments in the Medical Schools to professors or teachers specially qualified in the subject;

(b) providing that the Public Health Laboratories recommended to be established in each Presidency and Province should be attached to the Chief Medical School of the Presidency and Province, and should be properly equipped not only for purposes of clinical and scientific research, but also for practical instruction in Public Health; and

(c) requiring that all candidates for medical degrees or licences should go through a course of effective practical instruction in one of these laboratories, in addition to the qualifying course of systematic lectures in Public Health elsewhere attended.

Our recommendations with regard to the organisation of the Sanitary Department are as follows :—

(1) We recommend that all the members of the Sanitary Department should be borne on one list.

The provision that the members of the Sanitary Department should all be borne on one list would have great advantages in facilitating the training of Medical Officers of Health. Another advantage would be think it would be possible to transfer a member of the Sanitary Service, who had gained experience in connextion with a particular epidemic disease or a particular sanitary measure, to any locality where that experience might be required. A further advantage would be that stagnation would be avoided and that active and tactful Medical Officers of Health would find fresh stimulus to exertion in the knowledge that their work would come under expert scrutiny, and that promotion to a higher post would be open to them.

(2) We recommended that all appointments in the Sanitary Department should be made by the Health of the Department, subject of the approval of the Local Government, and that all the members of the Sanitary Department, whether engaged on executive duties as Medical Officers of Health or an exclusively scientific or scientific and teaching duties relating to Public Health, should be placed directly under the orders of the Health of the Sanitary Department; and one or more inspecting Medical Officer(s) of Health might, we think the appointed to assist the Head of the Sanitary Department in his work of supervision.

In support of this recommendation, we point out that the organisation of all Medical Officers of Health under the orders of a single Head would ensure, first that the experience gained in one place would be utilised in another; and, secondly, that all measures which were adopted throughout India for combating infectious diseases should be carried out with the same degree of efficiency, and should be informed by one and the same plan and purpose.

(3) We recommend that the Head of the Sanitary Service should occupy the position of Sanitary Commissioner to the Government of India. In view of the new administrative duties, which we would propose to commit to this officer, the majority of us think that the office of Sanitary Commissioner to the Government of India should be erected into a separate office, and that it should not, as at present, we held in conjunction with the Director-Generalship of the Indian Medical Service. We consider that, besides controlling the Sanitary Service and advising the Supreme Government on all matters relating to Public Health, the Sanitary Commissioner should inform himself, as far as necessary by personal visitation, regarding the

insanitary conditions, sanitary action, and prevailing diseases in all parts of India; that he should review the work of the scientific sanitary establishments; and that he should review the work of the should prepare an annual report dealing with these subjects. In order that his duties may be efficiently performed, we also consider that he should be provided with an adequate Medical and Clinical Staff, and he supplied with reports bearing on the above-mentioned subjects, especially including reports on Sanitation and on Vital Statistics, from each of the Presidencies and Provinces.

(4) In view of the importance of the functions of the Sanitary Department and of the Imperial interests which are involved and in view of securing that absolutely independent advice on sanitary matters should be placed directly before Government in a country, where, owing to the absence of independent medical public opinion, too much weight is likely to be given to the possibility of administrative difficulties arising in the carrying out of Sanitary measures, and finally with a view to avoiding the delays incidental to the submission of proposals to Government through an intermediary, we recommend that the Head of the Sanitary Department should be made a Secretary to Government.

The President considers that, if questions of administration should raise important difficulties against the adoption of the above recommendation No. (4), however desirable it may be in the interests of sanitation, the following should be proposed as an alternative, viz., that the Head of the Sanitary Department should have the right, on all occasions in which he deems it expedient, personally to submit his proposals and explain his views to the Member of His Excellency the Viceroys Council dealing with matters relating to Public Health.

Appendices and Summary

Conclusions as to Feasibility Adoption of Inoculation as a Plague Measure

With regard to the feasibility of adopting a general policy of inoculation, our conclusion, based upon the above consideration may be set forth as follows :—

(1) Experience gained hitherto has shown that it is very seldom possible to get a large proportion of the inhabitants of an uninfected place inoculated.

(2) It has been possible, where the inducement of exemption from segregation and eviction has been offered, to get a large proportion of inhabitants of an infected place inoculated quickly.

(3) It has been possible in one place, Mysore city even where no inducement that touched the great mass of the people could be offered, to get a considerable proportion of the inhabitants of an infected place inoculated quickly.

(4) It has been possible also to induce a large proportion of particular communities, such as the Khojas of Bombay and Karachi to be inoculated under the influence of their leaders.

Recommendations Regarding the Adoption of Inoculation with Hafekine's Vaccine as a Plague Measure Inoculation

Recommendation regarding adoption of inaculation as a plague measure

Our recommendations are governed by these conclusiom, as well as by the conclusion we have already drawn with regard to the protection conferred by inoculation. They are further governed by the consideration that it is necessary as far as may be possible, to dispel the particular objections on account of which the people have hitherto refrained from inoculation. Moreover, our recommendations are based on the consideration that it is advisable to make the operation as effective as possible as little inconvenient as possible to the persons inoculated and as easily carried out as possible by the inoculator.

(*i*) We have already insisted on the necessity for the accurate standardisation of the vaccine as being essential to the attainment of the best results, both as to the protection conferred and as to the duration of that protection. We have pointed out, also, that the introduction of an accurate system of standardisation may possibly obviate the necessity of employing two successive inoculation.

(*ii*) With a view to dispelling the natural fears of the people, and avoiding all unnecessary risk to the inoculated and further. With a view to enabling the inoculations to be carried on with the least possible amount of attendant inconvenience, we would insist upon the necessity that stringent precautions should be taken to insure that all the vaccine used is quite free from contamination, and we would recommend that the volume of the necessary dose should be made as small as possible.

(*iii*) With a view to removing any possible ground for distrust is to the conveyance of disease by inoculation from the person to another, we would recommend that the syringe should be sterilised in the presence of the person about to be inoculated.

(*iv*) We are of opinion that inoculations, under the safeguards and conditions stated above, should be encouraged wherever possible, and in particular, it seems to us desirable to encourage inoculation among disinfecting staffs and the attendants of Plague Hospitals.

Conclusion

We cannot bring to a conclusion this consideration of anti-plague inoculation by Mr. Haffkine's prophylactic fluid without expressing our sense of the importance of the method which Mr. Haffkine has devised and of the results which have been achieved by it. The credit due to Mr. Haffkine is the greater because the difficulties with which he had to contend in this matter could only have been overcome by great zeal and endurance. Mr. Haffkine's work on anti-plague inoculation while not based on any new scientific principle, constitutes it seems to us, a great practical achievement in the region of preventive medicine.

Summary Regarding the Serum Therapeutics of Plague

Summary

We have seen in the section of this chapter in which we deal with the results obtained in India by the experimental administration of Yersin's serum to animals artificially infected with plague that, so far as can be judged from the results in the case of the particular samples which were tested in this manner, Yersin's serum, as sent out from the Pasture Institute, Paris, contains therapeutically useful substances in greater or smaller quantity. At the same time we saw that in the case of certain samples of serum - we refer in particular to the samples of serum which were furnished to us and to that which was employed on human patients by the German Plague Commission - the dose of serum required to avert death from a plague, infected animal was so considerable as to make it *a priori* doubtful whether any considerable therapeutic effect could reasonably be expected from the exhibition of these sera to human plague patients.

In a subsequent section, in which we studied the results obtained upon human plague patients by the administration of Yersin's serum, we saw that, except in the series of observations made by ourselves and by the Russian Plague Commission, nothing in the nature of a strict statistical comparison could be made between the case - mortality of cases treated with serum and the case, mortality of cases not treated with serum.

There appeared however, in the case of the patients treated by Dr. Simond in Karachi and the patients treated by Captain Mason, R.A.M.C., in Cutch, to be clinical evidence sufficient to raise a strong presumption that the course of the disease was favourably influenced by the exhibition of the Serum.

In the case of our own experiments, conducted with a serum derived from the Pasteur Institute, Paris, further in the experiments of the German Plague Commission undertaken with a serum of similar derivation, and lastly, in the case of the observations made by the Russian Plague Commission on the effects of the administration of a serum prepared in St. Petersburg, the patients appear not to have benefited in any way from the treatment. At the same time there was not in any of these three series of observations any indication that the serum had in any way aggravated the disease.

In the case of the observations made by Mr. Haffine with a serum prepared by himself, there appeared, on the contrary, to be a balance of advantage is favour of the patients who were not treated with serum.

Lastly, to complete our summary of the effects of the administration of Yersin's serum, we may recall the fact that in the case of a quite considerable number of healthy persons inoculated prophylactically with Yersin's serum, such statistical results as were obtained were quite inconclusive on the question as to whether the fleeting protective effect which was expected was actually realised. It was, however, noted that in certain cases toxic phenomena, in the form of "fever, pain in the joints and swelling of the glands." Supervened upon the incorporation of the serum.

Passing now in our recapitulation to the effects of Lustig's serum, we saw, in the section of this chapter which dealt with the results obtained by the incorporation of Lustig's serum into animals, that the samples serum with which we were furnished apparently exerted an effect in the direction of diminishing the resistance to plague in the animals experimented upon.

When we passed to consider the average result attained by the incorporation of Lustig's serum into plague patients, we saw that, of the three successive series of observations brought forward by Dr. Choksy, the first two gave results which were, owing to the system of selection adopted, inconclusive. In the case, however, of the third series of systematic observations, where all possibility of selection was avoided by subjecting to the serum treatment every second patient who was admitted to the hospital, proof was afforded always assuming the accuracy of the hospital record which, since was had already left India, did not come before us — evidence of a diminished mortality on the part of the patients who were treated with serum. The diminished which was achieved amounted, as we saw, to a reduction of at least 11 per cent in the case — mortality of the serum cases as compared with that of the control cases treated under precisely similar circumstances. We did not come across any evidence that any unfavourable influence had been exerted when these sera were therapeutically administered to man. It is to be noted that the samples of serum tested by us were not employed upon men.

Conclusions

To sum up, we think we may, not only in view of the fact summarised above, but also of the unequivocal opinion expressed by Dr. Simond captain Mason, R.A.M.C., Dr. Choksy, and Dr. Nazareth, as to an improvement having been witnessed by them in the clinical symptoms of patients treated with serum, conclude that, on the whole, a certain amount of advantage in all probability accrued to the patients both in the case of those injucted with Yersin's serum and of those injected with Lustig's serum. It seems to us, however, not impossible, that in exceptional cases the serum treatment - and this statement, be it noted, could made also in connection with every other treatment which has been adopted - may have done positive harm. We can hardly doubt, in view of the experimented results which we obtained with Lustig's serum, and in view of the toxic symptoms observed by Dr. Simond in the case of healthy persons inoculated with Yersin's serum that the serum may, especially in cases where it was drawn off prematurely from the inoculated horses, have contained either toxic or anti-bactericidal elements with a view to preventing such deleterious sera coming into use, it seems us to be absolutely essential that all sera should, before they are brought into therapeutic application on man, be exhaustively tested upon animals.

Recommendations

With regard to the future preparation and therapeutic employment of anti-plague sera in India we may, perhaps, be permitted to offer the following suggestions :

(1) We desire to record our opinion that though the method of serum - therapathy as applied to plague has not been crowned with a therapeutic success in any way comparable to that obtained by the application of the serum method to the treatment of diphtheria nonetheless the method of serum therapathy is in plague, as in other infectious diseases, the only method which holds forth a prospect of ultimate success.

(2) We would suggest that the serum treatment has not as yet been sufficiently successful to make it desirable to extend the treatment, under present conditions as a general measure, over all the districts affected with plague. Rather, it appears to us, that the imperfections of the present methods of preparation and application should be fully recognised, and that it should be realised that the line of progress lies, not in the directions of applying the sera at present available to the largest number of patients, but in the direction of studying in the case of the animals who furnish the serum the blood changes which are associated with the incorporation of the plague toxins and with the elaboration of antidotal and bactericidal

substances. In like manner, we think that the condition of the blood in the human plague patient, and the changes brought about by the administration of the serum, should be carefully studied.

(3) With regard to the procedure followed in the preparation of the sera, we do not think that the facts, which have come before us, are in any way conclusive as to the superiority of the procedure advocated by Professor Lustig over the procedure ordinarily employed. It is true that in the case of Lustig's serum forth coming as to the mortality in plague having been diminished by the use of Yersin's serum. But this does not fore close the question. On the one hand, the absence of the required statistical demonstration of the diminution of case - mortality by the use of Yersin's serum may, so far as the observations of Dr. Simond and captain Mason, R.A.M.C., are concerned have depended upon the employment of faulty statistical methods. Again, quite apart from considerations such as those just referred to, the difference in the result obtained in the case of the two classes of serum, may quite well be attributable to the fact that Lustig's serum was, at least, in the case of the observations which have given a conclusively favourable result, prepared in India, and was thus presumably comparatively fresh serum while Yersin's serum, at least in the case of the serum which was derived from Paris, was applied only after it had been altered by heating and lapse of time. We, therefore, think that it would be wise not to neglect, in the future preparation of therapeutic sera in India, the simpler methods of employed by Yersin and others.

Conclusions Regarding Measures for Restricting Movements of Travellers by Railway

Our conclusions is connection with the question of placing restrictions on the movements of travellers by railway in order to prevent the spread of plague, are :

(1) That, while the spread of plague has taken place in a very large number of cases along the railway line, the number of cases of plague detected among travellers under the different systems adopted, has not been large;

(2) That any system of land quarantine imposed with the object of detaining all passengers from infected areas, either at a point where the infected and uninfected areas join, or at different places within the uninfected area, results in great hardship to the travelling public, and has not been found in practice to prevent the spread of plague;

(3) That in the special instance of Sibi, the objections to such a system are, owing to the fact that the traffic inwards is concentrated and a easily controlled not so great as elsewhere, while it is very important to take every precaution to prevent plague passing over the North-West Frontier of India;

(4) That any system of medical examination on railways which falls short of keeping travellers under detention for the ordinary period of incubation must be defective as a measure for stopping all infected persons;

(5) That, considering the small results attained by medical examination on railways. It is not necessary or expedient to maintain so many places for examination as hitherto: two of us, Dr. Wright and Dr. Kuffer, are of opinion that it would be well altogether to abandon medical examination on railways, except on the confines of important unaffected area which communicate with an infected area by only one line of railway;

(6) That it appears to be unnecessary to medically examine people travelling between places within an infected area;

(7) That it may be a wise precaution, in cases where large concourses of people from infected areas are expected to go to a place for a religious festival or similar gathering, to prohibit their travelling;

(8) That the disinfection of the personal effects of travellers by railway should not be attempted because —

  (a) disinfection, if carried out at all, should be through, and would then cause an amount of delay and inconvenience which will not be justified by the results; and

  (b) people when themselves travelling can evade the disinfection of their personal effects by despatching them by goods train. The disinfection of articles sent by goods train would be an impossible task.

Conclusions Regarding Measures to Check the Spread of Plague by means of Communication other than by Sea or by Railway

The conclusion follows, we think, from the results of the different efforts made in this direction, that unless circumstances are very specially favourable the attempt to keep a large mass of people in or out of a particular place by means of a cordon or a similar device is doomed to failure. It must be admitted that a cordon has moral effect, that it may by this means deter people from passing in or out of a cordoned place unless in the case of persons who have strong motives for closing so. But, under ordinary circumstances, the physical characteristics of the plains of India, covered as they are with countless paths and tracks, present great obstacles to the success of a cordon. In certain cases, however, as at mailer, where there is virtually a cut de sac, or where there is a river fordable only at certain definite and well-known places, the physical difficulties are less. In such cases an attempt to restrict the movements of the people by means of a cordon may meet with some measure of success. Where, again the infected area is very limited, and very strong establishments can be concentrated upon it, the restriction of the movement of the people by means of a cordon, if it could not be made absolute, could be made nearly so, provided that reliance could be placed on the watchfulness and the integrity of those employed on the cordon. But we fear that this is rarely the case in India; the men cannot be depended upon to remain at their posts, awake and alert; and they cannot be trusted to refuse bribes. The consequence, therefore, will almost always be that even in the rare cases where the physical conditions are favourable to the success of a cordon, the carelessness and venality of the guards on it will bring about failure. And in the great majority of cases the area to be guarded will be so great, and the possibilities of evading a cordon at night so many, that, even with establishments which could be implicitly relied on, it will be found impossible to make a cordon an effective means for preventing the spread of plague.

General Remarks on Plague Measure

Owing to fundamental changes of conditions in India between present time and time of last outbreak in India, measures adopted in 1896 were necessarily experimental.

It is impossible to from a just appreciation of the operations undertaken against the present outbreak of plague in India, unless it be remembered that, previous to the commencement of this outbreak, plague had for 60 years been unknown in the plains of India. Moreover, the last outbreak, that of 1836, was purely local, and confined to Rajputana. There has in the interval, been a fundamental change in the conditions of life within India, and in the commercial relations between that country and the rest of the world. Sixty years ago communication between England and India was slow and not very frequent; between India and other countries it was even rares. Now, steamers arrive daily at the chief ports of India, not only from England, but also from the main trading centres of the Eastern and the western world. Within the continent of India the opening of railways and the improvement of communication by road have entirely revolutionised the habits of the native community both in the towns and in the villages. Plague, when it reappeared in India in 1896, found both the people and the servants of the crown in India without any practical acquaintance with its clinical or other characteristics or any recorded experience to show how an outbreak could best be dealt with is an oriented country circumstanced as India is to-day. How different the conditions of the present time are from those of former times may be gathered from the fact that when in 1815 a medical board was appointed in Calcutta to consider the danger of the introduction of the plague into the city, the direction from Arabia, and not from any part of the continent of India, though at that time plague was severe in a part of the Bombay presidency. The various measures taken on the occurrence of the outbreak in 1898 were thus to a large extent experimental.

Every possible measure applied and tested, and every possible effort made to check the epidemic

It was recognised, alike by the Government and by the more enlightened classes in India, and by public opinion elsewhere, that no reasonable measure should be left untried to prevent, if possible, the spread of plague. The feeling of one and all was that its progress must, if possible, be stopped at all hazards. But at the time no one was able to foresee with certainly how far each particular measure which appeared to be feasible and to be theoretically good could be effectively carried out in the existing conditions of native society. In these circumstances it is not surprising that not all the measures applied have been found to be beneficial, for the anticipated good counter balanced by unanticipated evil effects. The evidence given before us shows that every possible experiment has been tried, and every possible effort made to restrict and eradicate the disease. If the results have not always been commensurate with the labour and expense incurred by the authorities who devised the measures, or with trouble and inconvenience fell by those to whom the measures were applied, it must, we think, be recognised that, considering the nature of the problem with which the authorities in India were called upon to deal, this was unavoidable. If in our judgment it has appeared that all the thought, time, labour, and money devoted to the campaign against the plague have, at some places, not resulted in any great alleviation of it severity or in the interruption of its progress, this conclusion involves no condemnation of the action taken. It is comparatively easy, on an examination of the results of a particular measure, to form an opinion of its success or failure. It was, we think impossible to predict, when the outbreak commenced, which measure would succeed and which would not succeed. No one, however, can fail to admire the fertility of resource and the unceasing vigilance of the different Local Governments and Administrations which had to deal with outbreaks of plague and in particular the Government of Bombay, upon which the great brunt of the work has fallen; the readiness and energy with which the ruters of Native States followed the bead set to them in British India; the zeal and devotion, not only of the officers of Government, Civil, medical, military, and the subordinate officials, but also of many willing unofficial helpers who have sacrificed their time, and some of them their lives, in the execution of plague duty; and the patience and fortitude of the great mass of the people in the calamity with which they were attacked.

The Measures Likely to be Most Successful with Plague are those now adopted in all Countries for Infectious Diseases in General

In our survey of the measures taken in Indian towns and villages, we have noticed that a certain amount of success has been claimed for almost every measure, but that no single measure has been uniformly successful. We have already summed up briefly our opinion as to the degree of success or ill-success which has attended the various plague measures adopted in different places throughout the country, and it remains for us to consider the question as to what combination of measures will produce the maximum of good.

For indications as to what methods are likely to prove most successful in dealing with plague in India, we must look to the methods which have been most useful in dealing with other infectious disease in all countries. The old methods of treating an outbreak of epidemic disease - methods such as quarantine, cordons, and segregation of the contacts - which imposed unnecessary restrictions on the healthy, are everywhere being gradually but surely given up, and in their place, notification of disease, isolation of the sick, and disinfection are being substituted, and inoculation is being resorted to as a prophylactic measure. Theoretically there is nothing to be said against the older measures and, indeed, nothing could be more well advised than to prevent people in the incubation period of disease from entering a country, or to isolate those who have been in contact with the sick, or to prevent such people from leaving an infected district, and yet these measures are in practice gradually being given up, simply because they are impracticable, this impracticability being due to the facility with which they can be evaded by healthy people. In comparison with the foregoing the measures of isolation of the sick, disinfection, and inoculation are more easily applied, provided a sufficient staff is available, and their application entails but little hardship on the friends of the patient while the inducement to pride cases is reduced proportionately.

Even with the Best Measures Rigidly Applied from Plague, will still Subsist

If every case of plague could be isolated at once, and if the personal effects, clothes and house of a patient were disinfected, and, further, if all plague-infected rates were removed and burnt and the houses in which these had been found were disinfected, and finally, if the healthy persons who are exposed to infection would be inoculated, the ravages of plague would be minimised. But remembering how imperfectly any measure is likely to be applied in practice, it is not to be expected that these measures, whether separately or in combination, will suffice to extirpate the disease. Isolation of the sick, for instance, can only in rare instances be applied so early that all contact of healthy people with the patient can be avoided, disinfection cannot protect those already infected, and inoculation is unsuccessful in a number of cases. The fact must be faced, therefore that there are no means of stamping out the present epidemic of plague in India, that, even with the best measures most rigidly applied, a certain amount of danger subsists, and that all that can be done is to lesson the danger as much as possible.

Staff and Resources Necessary for Strict Application of Measures must soon be Exhausted in a Widespread Epidemic

A point all important in connexion with this question is that of the staff and funds available for the execution of any measures. Even supposing the funds to be practically unlimited, the time will soon come when, in any country, and especially in India, the staff available will be insufficient, and we cannot too strongly insist on the fact that, for effectively carrying out any plague policy in an extended epidemic, a reliable and enormous staff is a necessity. In illustration of this we may point to the following instances. In the North-West provinces, the outbreak extended to one town of 16,000 two towns of about 5,000 inhabitants out each, and eight villages in their immediate neighbourhood. Excluding the Europeans, the establishments employed on plague duty in this small infected area on April 1st, 1898, comprised 92 native medical subordinates, male and female 45, others native subordinates, 106 village watchmen, and a police force of 342 officers and men. In Punjab, the outbreak of 1897-98 was confined to a couple of small towns and 84 villages situated in the adjoining tracts of two districts. The establishments employed in carrying out the measures against plague, exclusive of those employed in searching for plague in villages not known to be infected, were at one time in May 1898, 16 European medical and Civil officers, six subordinate native civil officials, 94 native medical subordinates, male and female, and a force of police of 2,872 officers and men. With establishments of this strength, and operations concentrated over a compact area in which their were no great physical and climatic difficulties, measures of compulsion were successful in preventing the spread of the infection to any considerable distance. It is impossible, however, to estimate what establishments would be required to carry out measures successfully in Calcutta and Bombay, or in places as widely infected as the Dharwar, Belgaum, Satara, Sholapur, and other districts in the Bombay presidency were at one time or another. It appears certain that the resources of Government would be insufficient to provide establishments for the area already infected in India even it the whole of the Army, Civil, medical, and police establishments were employed solely on plague duties. Even for such measures as the isolation of the sick, disinfection, and inoculation it is clear that in a badly infected district the available staff and resources will soon be exhausted, and hence it will be necessary, before adopting a particular policy in each locality to consider the staff that is available to carry out that policy.

Measures Recommended for Places of over 2,000 or 3,000 Inhabitants

It appears to us that in places containing more than 2,000 to 3,000 people - the President and Mr. Hewett are of opinion that the limit of population should be 10,000 - the only measures which can be applied are disinfection, inoculation and, possibly (so long as infection has not spread throughout the town) isolation of the sick, and the evacuation of specially infected quarters: the President considers that isolation of the sick should be carried out in all places. The value of disinfection is especially great when it is applied to imported cases or the first indigenous cases. Segregation of contacts and a general eviction of the inhabitants of large towns, have, in our opinion, done a great deal of harm. In particular, the wholesale evacuation of large towns containing a considerable artisan or trading population will almost always be the flight of many infected people into another area, and the consequent spread of the disease. The isolation of the sick can, we are convinced, be carried out satisfactory only when they are removed to hospital, but we see no reason why, in circumstances in which removed to hospital is impracticable, isolation should not be attempted in the patients house. Disinfection is a measure which appears likely to influence the course of the epidemic, but it must be remembered that efficient disinfection requires not only a large staff, but a trained staff, and that throwing a certain amount of perchloride of mercury on greasy walls is not disinfection. Further, it must be remembered that, as already pointed out, houses are after disinfection liable to be re-infected by the agency either of rates or if men. It is impossible to provide against this effectively except by postponing disinfection until such time as the plague has died out both among the rates, if these have been affected, and in the human community; but this policy, though it may be carried out in place where evacuation is resorted to is plainly impracticable in the case of large towns. In these, even though there is always a risk of the re-infection of disinfected houses, yet the advantage of destroying a considerable mass of infective material is so great as to render chemical disinfection clearly advisable. It is probable that the cost of chemical disinfection might be considerably lowered by limiting the operations to such things as really do require to be disinfected, or by adopting non-destructive methods of disinfection. It would be an advantage also, provided that the inoculations can be performed under the safeguards more particularly referred to elsewhere in this report, to inoculate disinfection Gangs, those engaged in plague operations, and as many of those who run any risk of infection, as are willing to submit to inoculation.

Among measures of disinfection which should be carried out, the President would include the opening up of houses, wherever necesssary for the introduction of a sufficiency of light and air.

In large towns in which plague cases are continuously occurring, and in which the amount of plague is subject to great seasonal variations, we think it a matter of great importance that plague measures should be carried out with especial vigour at the season when plague is at its minimum. At such a season, in view of the amount of personal supervision that could be given to each case with the relatively large subordinate staff that would be available, the chances of extirpating plague in such a town are very much greater than at the season when the disease is most prevalent.

Measures Recommended for Villages

In villages also chemical disinfection and inoculation should be applied; but very soon, in a badly infected district, the available staff and plant must become insufficient to cope with the work. We are of opinion that, as soon as this point is reached, chemical disinfection should be concentrated on one or two villages with a view to make it effective there and that it should be totally abandoned in the other villages, where it would only worry people and where it could not be carried out properly. In such villages the measure which must be chiefly relied on is evacuation. In the opinion of the President the evacuation should be conjoined with an opening up of the houses sufficient for the admission of sunlight and air wherever this is required. But evacuation carried out with an insufficient staff is, in many ways, an imperfect measure. In the circumstances it will not be possible to secure the isolation of the sick in village camps. In respect to this, nothing more can be done than to advise the people to isolate their sick. The necessity for this with reference to certain more familiar infectious diseases, is understood by the people, and they to some extent, endeavour to carry it out themselves. Again, evacuation with an insufficient staff is an imperfect measure, in as much as the evicted people carry out with them into camp plague-infected clothes and other articles, which it will be impossible to disinfect. Further, in the circumstances which we are considering it will not be possible to prevent the people from revisiting their infection causes. Lastly, in many cases there will be a risk of some of the evicted people disinfected to spread the plague to previously uninfected places; this risk, however, is probably small where the evicted people are agriculturists whose interests will be concentrated in their fields. Moreover, evacuation is only a cumbersome method of committing to the slow operations of nature the work of disinfection which might be efficiently carried out much more quickly by artificial means. But, in spite of its imperfection, evacuation would appear to be the only measure applicable to villages in cases where chemical disinfection cannot be applied. It is, however, to be borne in mind that climatic conditions are a most important factor in determining whether evacuation can be carried out or not. Except in a few districts in India, it appears hopeless to achieve effectual evacuation during the rains, especially in villages situated on a black cotton soil. No amount of persuation will induce people to stay out in camp under such conditions, and they will, almost inevitably, at any rate attempt to return to their houses to sleep. The only result of an attempt to keep people out of their houses will be an immense amount of dis-satisfaction unaccompanied by corresponding advantages. Whether, during the rains, evacuation could be effectively carried out on a light sandy soil depends upon various local conditions which cannot be enumerated here, but we are strongly of opinion that, before submitting people to the discomforts of evacuation, there should be no doubt that the hardships inflicted on the people will in all probability yield a balance of advantage.

Where it is found that disinfection and evacuation are both impossible, then in particular, we think that inoculation should be resorted to much can be done in this direction with even a small staff for a properly trained Assistant Surgeon could in a short time inoculated the population of a village. Of course, neither in such cases nor in any other case, could inoculation by itself extirpate the plague, because a number of people will get plague in spite of inoculation.

Advisability of Carrying out some one Measure Thoroughly, if Staff not Available to Carry out all Measures Recommend

We believe that by a careful application of a policy such as that outlined above, much might be done to modify the course of an epidemic, and many valuable lives would be saved. In the application of these methods, it must, however, be clearly understood that it will always be better to apply any one of them efficiently and thoroughly than to try and apply all of them with an inadequate and insufficiently trained staff. Unfortunately we cannot anticipate that India can now be freed from plague by the measures we have suggested any more than Europe has been entirely freed by sanitary measured from other zymotic diseases.

A Precise Statement of Measures Recommended by the President stated Separately

The President believes that a precise statement of the measures applicable at the beginning and at a later stage of an outbreak of plague in places of large and small size, respectively, would with advantage be added to the above. He has expressed his views in an Appendix to this report.

Attitude of People Towards Plague Measures

We may now proceed to review again the attitude of the people in its relation to the application of the plague measures dealt with above. One point which we particularly desire to emphasise is that measures which press with severety on the inhabitants of an infected place, as a whole, or on the friends and relatives of the patient as distinguished from the patient himself, can never be enforced in the case of a widespread epidemic by the staff available in India. The coercion of the people into compliance with regulations against plague is not a practical policy. But we believe that a great deal can be done persuasion and by practical demonstrations of the utility of certain measures. A formidable obstacle to the recognition by the people of the necessity of enforcing measures against the plague is, indeed, to be found in the fatalism which the native of India shares with other Orientals. It appears to us that, though an Oriental may theoretically assert that fighting against fate is useless, this belief will not prevent him from defending his life, from calling in the native *hakim* when ill, or from flying from an epidemic. What he does bitterly resent is to be obliged to submit to measures the use of which he does not understand, and of which he is naturally suspicious. Signs, however, are not wanting that, among the population that has been affected by plague, the fatalistic attitude of the people towards the plague has been modified. From the evidence placed before us, we are convinced that in parts of the country the people have begun to recognise the advantages of taking certain measures against the disease, and to appreciate the motives of the Government in taking steps for its extirpation.

Good Effects of Evacuation Appreciated

With regard to evacuation there can be no doubt, in many places, the agricultural population, at all events, have learned to believe in it, and they unquestionably will appreciate its good effects still more when further demonstrations are at hand. We have seen that is some parts of India the natives evacuate their villages spontaneously on the appearance of plague or the discovery of dead rates.

Better methods of Disinfection Likely to Lessen Unpopularity of this Measure.

Chemical disinfection, on the other hand, is a measure strongly objected to, perhaps because in India disinfection has often been inefficient, and perhaps also because it has been accompanied by other measures often extremely distasteful to the people. The methods of disinfection which have been in use have, as we have seem, sometimes entailed no little damage to the goods of the people. Posts and pans have been broken: rags have been burnt, which, although of no marketable value, may have been of value to the owner. True, the Governments has paid compensation, but Orientals attach great importance to the manner in which things are done, and are frightened by anything like a display of force or violence such as is entailed in the destruction of crockery, the burning of clothes, the digging up of floors, and the breaking up of furniture. The moral effect as well as the efficacy of every disinfecting process should be considered, and, in our opinion, nothing should be needlessly destroyed. If this principle is kept in view, we many hope that the people will be conciliated to the necessary disinfecting operations.

No Reason Why Inoculation, Encouraged by Persuasion, should not Become Popular.

The principle of inoculation is one with which, thanks to small-pox vaccination, the natives are to some extent familiar. They will learn to appreciate the advantages of anti-plague inoculation more and more as better results are obtained. However, in encouraging inoculation, due warning should be given that the protection which is conferred by the process is by no means absolute. In some instances where the people have not been duly warned, they have declined to have anything to do with inoculation, because some of the inoculated died from plague. In such cases people are apt to forget the good which has been achieved, and the intensity of their disappointment leads them to condemn utterly a system from which they have allowed themselves to expect too much. The people, therefore, should be distinctly told that inoculation is not by any means a certain prophylactic, but that it considerably reduces the chances of the inoculated getting plague, and that an inoculated person when attacked has increased chances of recovery and that the process, if properly conducted, is harmless. It seems to us that attempts to make the people resort to inoculation should be limited. We see no reason why anti-plague inoculation, if furthered in this manner, should not become a popular measure.

Increased Communications Now Render Spontaneous Disappearance of Plague Not so Likely as in Past Time.

In view of the attitude of the people towards plague measure, and the imperfections of the measures which can be applied, we may, before leaving this subject, consider the possibility of the disease disappearing spontaneously, as it has in time past disappeared from Europe and from India. We may well hope that is may occur again in India. But we must point out that the conditions are essentially different now from what they were in former centuries, or even at the beginning of this century. In as much as plague has been shown to travel along the lines of human communication, the chances of a place being infected and reinfected from any plague-stricken localities in India have increased correspondingly with the greater facilities for intercommunication. Hence, the extinction of plague may possibly be a much slower process than formerly for in every place the chances of re-infection have been increased.

With further spread of epidemic the natives of India must in the end depend for protection against plague largely on their own application of plague measures.

If, accordingly; plague should spread, the staff available for combating it will become proportionately smaller. Soon a line will come when the amount of supervision which can be given to each village must be very small, and nothing can be more certain than that in the end the native of India will have to depend for his protection against plague, to a very large extend, upon his carrying out the appropriate plague measures for himself. He can be prepared for this, not by the adoption of impracticable measures, such as cordons and quarantine, but by giving him practical illustrations of the good achieved by measures which experience has shown to be the most effective.

Sanitary Improvements

The effect of sanitary surroundings on plague has been considered elsewhere in the report and we have already sat fourth own conclusions regarding the character and extent of the sanitary improvements of which the adoption can be recommended as a measure for the suppression and prevention of plague.

The president has set forth his personal views on the subject in Appendix III to this Report.

Recommendations Regarding the Organisation of the Sanitary Department in India

1. Existing Arrangement of the Sanitary Department in India

Necessity for improving the organisation of the Sanitary Department in India

In the course of own inquiry into the different questions referred to us in connection with the spread of plague, we have formed some conclusions as to the necessity for the improvement in certain direction of the organisation of the Sanitary Department in India with the object of dealing more effectively with outbreaks of plague and other epidemics and with the general sanitation of India. Our conclusions we shall endeavour to set down as briefly as possible.

The existing arrangements of the Sanitary Department in India are as follows: The office of Sanitary Commissioner with the Government of India is combined with that of Director-General of the Indian Medical Service. The officer who holds these combined offices, as Sanitary Commissioner advises the Government of India on Sanitary matters. His reports are made to the Government of India, by which all directions regarding sanitary matters are given to the Local Governments. Except through this channel, he has no authority over officials in the Sanitary Department serving under any of the Local Governments. These latter exercise entire control over the Sanitary Commissioners and Deputy Sanitary Commissioner serving under them. Under the Local Governments in Madras, Bombay, Bengal, the North-Western provinces, and the Punjab there is a Sanitary Commissioner, who is a member of the Indian Medical Service. These officers are charged with the duties of advising the Local Governments on all sanitary matters; of inquiring into all outbreaks of epidemic disease; of controlling all operation connected with vaccination in their provinces; and of supervising registration of vital statistics within them. In each of the other Provinces the duties of Sanitary Commissioner are undertaken, in combination with those of the Supervision of Civil Hospitals, by the Inspector-General of Civil Hospitals. Under the Sanitary Commissioners in the larger provinces there are a varying number the Deputy Sanitary Commissioner. The largest number, viz., five are employed in the Bombay Presidency. The districts supervised by the Deputy Sanitary Commissioners are in all cases so extensive that it is not possible for a Deputy Sanitary Commissioner to visit in any one year more than a small number of the villages which call for inspection. In all provinces, excepting Bombay, the Civil Surgeon, who is the Medical Officer of the district or unit of civil administration with a province under charge of a collector, has also to undertake the duties of Health Officer of the district, and to advise the local civil authorities on all matters connected with sanitation. The Civil Surgeon of a district in the Bombay Presidency is not required to undertake these duties. As a rule, no subordinate establishments employed in the conduct and inspection of vaccination are utilised also in Sanitary work.

Sanitary Boards

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Outside the Sanitary Department there are, under the different Local Governments, Sanitary Boards composed of a varying number of members belonging to the medical, sanitary, civil engineering, and civil branches of the Governments Services, with some non-official members. All the larger measures of sanitary improvement, such as projects for improvements in water supply, have to be considered by these Boards before they are undertaken.

Existing Arrangements Regarding Health Officers

In the Presidency towns of Calcutta, Bombay and Madras, European Health Officers are employed by the Municipal Corporations. These officers are sometimes selected from the Indian Medical Service and sometimes not. They are directly subject to authority of the Municipal Corporation by which they are employed.

A few separate Health Officers, who may or may not be members of the Indian Medical Service, are employed also by other large Municipalities, to which they are directly responsible. But as a general rule a Municipality does not employ a Separate Health Officer, but is entitled by regulation to the services and advice of the Civil Surgeon in his capacity as such. This rule, however, is not followed in the Bombay Presidency, the Civil Surgeon there having no responsibilities in connection with Municipalities.

In the chief parts, port Health Officers are employed under the orders of the Local Governments to supervise the arrangements with the granting of bills of health and similar matters.

Sanitary Commissioner under existing system not necessarily sanitarians, and liable to recall to military duty.

It appears to us that the existing organisation is defective some very important particulars. In the first place, the system of selecting Sanitary Commissioners, who are the chief inspecting officers of the Department, seems to be faulty. They are appointed for a term of four to seven years from among members of the Indian Medical Service. It is not necessary that they shall have served an apprenticeship in the Sanitary Department. In selecting officers for these appointments regard is, no doubt, given to the knowledge which they possess of sanitary questions, but there is no guarantee that an officer selected to be a Sanitary Commissioner should have made a special study of sanitary science.

It also appears to us to be a defect in the present system that a Sanitary Commissioner should be liable to be recalled to military duty in case of war. If it be urged that, although this liability exists, it is never enforced, it must be admitted that the Sanitary Commissioners are not an effective part of the military reserve, and that no harm would result from taking them out of it.

In Calcutta and Bombay, Health Department undermanned and position of Health Officers not Sufficiently independent.

There are other points also in which the present organisation appears to us to be defective. The Health Department is towns such as Calcutta and Bombay is not sufficiently strong is Medical Officers for the duties which it has to perform even in ordinary times. It is a matter of Imperial interest that the sanitary arrangements in these cities should be effectively supervised and controlled, and that the medical establishment for this purpose should be adequate. It appears to us to be quite impossible for the European Medical Officer to properly perform the duties of Health Officer in the cities mentioned and the other larger towns of India. Moreover, the Health Department in these places appears to us to be at a disadvantage, not only by reason of its being undermanned, but also by reason of the position of the Health Officer not being sufficiently independent. The appointment of Health Officers at Bombay and Calcutta is made by the municipal authorities, subject to the approval or confirmation of the Local Government. The Health Officer has no means of carrying into effect sanitary measures of essential importance if the municipal authorities are not favourable to them.

Civil Surgeons unable, in addition to performing their other duties, to control sanitary administration of Municipalities and rural areas in their districts.

We have observed that the Civil Surgeon has ordinarily, except within the Bombay Presidency, to advice the municipal committees within his district upon sanitary matter. His ordinary duties are of a multifarious character, and often do not leave him with the leisure necessary to devote proper attention to sanitary question even within the municipality at the headquarters of his district. Moreover, his functions are simply those of an adviser; he has no power to carry out any recommendation that he makes. Thus, even in the large municipalities outside the presidency towns in India, insuperable difficulties may thrown in the way of a Civil Surgeon who is endeavouring to carry out sanitary improvements.

In his capacity as Health Officer of his district, the Civil Surgeon is hampered by the numerous duties at headquarters which prevent him from travelling about his district, and by the fact that he has no subordinates with Medical and Public Health Qualifications who he can utilise for making visits of inspection into the interior.

No Agency at Present for Bacteriological Work

Lastly, the existing organisation seems to, us to be defective in that it comprises no agency for inquiry into bacteriological and other questions connected with the public Health, with the Single exception that the Chemical Examiner in the North-Western Provinces is also bacteriologist to the Local Government.

Recommendations for the Reorganisation of the Sanitary Department In India

Questions to be considered with reference to suggested improvements.

We would recommend that the Sanitary Service should be reorganised, and that an Imperial Sanitary Department should be established in India, somewhat on the lines which we have sketched below.

We have to consider is connection with the proposed Sanitary Department :

(1) The question of the present and future recruitment of the staff of the Sanitary Department.
(2) The question of the augmentation and strengthening of the present Sanitary Staff.
(3) The disposal and functions of the various members of the Department.

(1) Present and Future Recruitment of the Staff of the Sanitary Department

We propose that the following might immediately be brought on to the permanent staff of the Department :—

(a) The European Medical Officers of Health who are at present in the service of the various Municipalities.
(b) The Port Health Officers of Bombay, Calcutta, Karachi, Madras, and Rangoon.
(c) The medical officers who now hold appointments as Sanitary Commissioners and Deputy Sanitary Commissioners of the different provinces.
(d) The bacteriologists who are now in the employ of the Indian Government.

(e) Civil Surgeons and their Assistants in so far as they perform Sanitary duties, and the staff of the Vaccination Department.

With regard to the future recruitment of medical men for the permanent staff of the Department, we would suggest that, as the services of men of special training and ability will be required, the emoluments of the appointments in the Department, should be fixed on a scale sufficiently liberal to attract men of the class required, and that these appointments should be opened, on the one hand, to officers of the Indian Medical Service who have gone through a special course of training, and on the other hand, to other medical men who have special qualifications in Public Health. In the case of appointments from the Indian Medical Service, we would suggest that to appointments might, with advantage, be limited to officers of less than seven years service, provided that before assuming duty they shall have studied Public Health in courses equivalent to the requirements for Degrees or Diplomas in Public Health.

(2) The Augmentation and Strengthening of the Present Sanitary Staff

(a) Medical Officers of Health

We consider that the administrative Department as thus constituted would urgently require to be strengthened in several directions. We think that it ought, in the first place, to be strengthened by the appointment of a number of additional Medical Officers of Health. We would recommend that a Special European Medical Officer of Health should be attacked to every city in India which contains a population of more than 100,000 inhabitants. And, in as much as the limit of population which a single Medical Officer of Health is capable of supervising effectively may be fixed at 100,000 inhabitants, we propose that in the case of cities one European Assistant Health Officer should be provided for every 100,000 inhabitants in excess of the limit specified above. We think that, while the municipalities to which Medical Officers of Health may be appointed in accordance with our recommendations should provide for the salaries attached to the appointments of such officers and that assistants, they should not have the power of nominating to these appointments or that of removing officers who have been appointed.

(b) Special Scientific Officers

Further, we would recommend that the staff of the Sanitary Department should be strengthened by the recruitment of a number of specially trained Medical Officers to fill the various scientific posts which ought, in our opinion, to be created.

(c) Chemical Examiners

Again, it might be useful to include the Chemical Examiners in the staff of the Department, in order to have available within it officers capable of conducting chemical analyses, but the duties which the Chemical Examiners have to perform in connection with medico-legal work may possibly be an obstacle to this being done.

(d) Civil Surgeons

We think that the Civil Surgeon in the Bombay Presidency should be given similar duties in respect of sanitary matters to those which are entrusted to the Civil Surgeon in other provinces.

(e) Assistant Surgeons

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In order to assist the Civil Surgeon in his duties of Health Officer of the district, it is desirable that an Assistant Surgeon, qualified by his knowledge of hygiene, should be appointed in each district. This Assistant Surgeon could be employed at times in temporary charge of the Hospital at the district headquarters so as to admit of the Civil Surgeon making tours of inspection in the interior of the district; and at other times the Assistant Surgeon could himself be engaged on the duty of making such tours. For these purposes men of special attainments and qualification would be required, and we think that, as preliminary to their employment in the Sanitary Department, a certain number of them might be employed in the higher grades of what is now the Vaccination Department, where qualifications and abilities could be tested.

(f) Inspectors and Superintendents of Vaccination

In as much as the Inspectors and Superintendents of Vaccination have, under present arrangements, no medical qualifications and no special knowledge but which they acquire in the course of their employment in the Department, we think that it would be of great advantage from a sanitary point of view to appoint Assistant Surgeons to the position of Inspectors or Superintendents of vaccination. Under such an arrangements the work of Vaccination would not be less efficiently performed than heretofore, while that of the Sanitary Department would be materially improved.

(g) The Disposal of the various Members of the Sanitary Department

With regard to the disposal of the staff it follows from what has been said above that the various members of the Department should fill the posts (a) of Medical Officers of Health to the larger cities, (b) of Medical Officers of Health to the various sub-divisions of each Province or Presidency, (c) of port Health Officers to the various large ports, and (d) of administrative or supervising officers. In addition, we propose that a certain number of members of the Department should be employed on scientific investigations in connection with important questions of Public Health; and the President proposes that a certain number, also should be employed both in scientific investigation and in the teaching of Public Health, as explained in paragraph 754 below.

Functions of Medical Officers of Health

We do not think that it is necessary here to attempt anything in the way of an enumeration of the various duties which should be undertaken by the Medical Officers of Health. It will suffice if we advert to certain duties which appear to us to be particularly important.

(a) Sanitary Control over Lodging-houses and the Erection of Houses

We have already, in connection with the consideration of the influence to the fact that the condition of many of the dwelling houses in the large towns in respect of over-crowding and in respect of structural defects is much as to make a healthy existence in them practically impossible. In connection with duties of Medical Officers of Health of large cities, such as Bombay or Calcutta, we would particularly emphasis the importance of exerting a sanitary control over lodging-houses for the prevention of over crowding. We are of opinion that structural defects might study, but effectually, be remedied, at any rate in the larger towns, if the Medical Officers of Health were empowered to veto the erection or the rebuilding of grossly insanitary buildings within the limits of the municipalities to which they were attached. The President, however, is of opinion that the prevention of "overcrowding", in so far as this implies a limitation in the number of the occupants of rooms based merely upon their cubic capacity can, at present, have little beneficial result; for in the great majority of the dwelling. Whether Lodging-houses or not, a reasonably pure air would not thereby be secured on account of structural defects and insanitary surroundings. He considers also that the remedying of the prevailing structural defects of existing building urgently require attentions, and that the measures which are being carried out with this in Calcutta, Bombay, and other cities and towns, should be continued and extended.

(b) Collection and Scrutiny of Accurate Death Reports

Another of the most important duties of all Medical Officers of Health, whether in the large cities or in the districts, will in our opinion be the duty of collecting accurate death reports. It ought to facilitate the introduction of sanitation into the villages and towns if provision were made that weekly reports of death should in all cases be sent in to the Civil Surgeon as medical Officer of Health for his district, with a view to their being carefully scrutinised in order that the existence of plague or any other epidemic disease may be brought to light. In the event of any serious mortality being detected by this method in the villages or towns, we think the authorities at the Headquarters of the Sanitary Department should be immediately informed, and the inquiries into the cause of the excess of mortality should be instituted without delay. For this purpose we think that the Assistant Surgeons who we have proposed to attach to the vaccinating staffs might very appropriately be utilised.

(c) Measures against Plague and other Infectious Diseases to should be undertaken with advice and under Control of Members of the Sanitary Department

Again, one of the most important of the functions which we would propose to entrust to the Medical Officers of Health is the duty of advising with regard to all measures taken with a view to combating plague and other infections diseases. We consider the functions of the Medical Officer of Health ought not to be limited to advising. We propose that the direct conduct of the operations which are undertaken should, so far as this does not involve an abdication of authority on the parts of the Health Officers who are now styled Deputy Sanitary Commissioners, or to the Civil Surgeon in his capacity of District Health Officer. Where the local medical officer is, for any reason unavailable for the duty, we suggest that another member of the Sanitary Department should be departed to take charge of the operations.

In advocating the plague operations should be under the direct Supervision of Medical Officers who are members of the Sanitary Department, or who are acting under instructions from the Sanitary Department, we are advocating a definite departure from the practice of committing the conduct of plague operations to civil as distinguished from medical officers. We would however, in connection with this, point out that what we advocate is merely that the practice which as long been adopted in connection with vaccination operations directed against small-pox in India should be extended to the operation which are taking place against plague and epidemic diseases. We are convicted that in the case of plague, just as in the case of small-pox efficiency can be secured only by placing the staffs and the general direction of the operations under the control of medical men who possess the necessary technical knowledge; while we are convinced of this, as we have indicated above, do not fail to recognise that, just as a veto is reserved for the civil administration in cases where the undertaking of vaccination operations may involve political or financial considerations, so it will, on both these grounds similarly be necessary in the case of plague than in the case of small-pox, where circumstances seldom call for its exercise. Subject to this necessary veto, and of course, to the provision that the local Civil Authority must, with a view to exercising that veto, always be fully informed beforehand of the exact nature and extent of the operations which it is proposed to undertake, we think, as stated before, that the conduct of the operations ought in all cases to rest with the Sanitary Officer.

Among the things which impressed us most in India was, first, the utter absence of a uniform system of dealing with plague, and, secondly, the fact that very little of the experience which was gained in one place was rendered available for use in another. This absence of uniformity was seem not only in the case of general plague policy, but it was seen also, and even more glaringly, in connection with matters of a purely technical character. We have referred in our survey of the disinfection operations to the futility of many of the methods which were adopted and to the technical errors which were repeated over and ever again in scores of different places. And this was necessarily so, for the officers in charge of the plague operations in each place had to work out for themselves a system of disinfection quite regardless of the experience which had been gained in other places. While we have nothing but admiration for the zeal and energy which was everywhere displayed, we are of opinion that there was much misdirection of effort. Now this could in large part be remedied by technical matters in connection with those plague operations should be placed in the hands of an Imperial Sanitary Department.

Mr. Hewett and Mr. Cumine do not concur with the above remarks. They do not agree with the recommendation made in this paragraph that the Medical Officer of Health of a Municipality or some other members of the Sanitary Department should, so far as does not involve an abdication of authority on the part of the Civil Officer, invariably have the direct control of all measures undertaken to combat plague and other infectious diseases. They think it sufficient to point out that there may be and in their opinion there often are reason which make it advisable to place in charge of the actual operation against plague an officer other than a medical officer.

(d) Necessity for Establishment of Bacteriological Laboratories

So far we have dealt only with the functions of the administrative as distinguished from the Scientific branch of the Sanitary

Service. The functions of this last branch are in our opinion not less important in their way than the functions of the administrative branch. To this branch would naturally be committed the bacteriological diagnosis of doubtful cases of plague or of other epidemic disease, the conducting of experiments to determine the effect of various disinfectants and to determine the mode of life and history of the various pathogenic agents, the mode in which there effect an entrance into the organism, and many other questions of similar nature of anti-plague and anti-small-pox vaccine, and of all other vaccines which may prove themselves to be effectual in the prophylaxis of disease. The efforts of the Department might, we think, usefully be directed also to the endeavour to produce thoroughly effective sera for the therapeutic treatment of plague and other infective fevers and of snake poisoning.

We think that it might be well to concentrate the manufacture of vaccines and therapeutic sera and the special study of questions relating to there in a Central Institute of Public Health which for climatic considerations ought, we think, to be situated somewhere in the Hills, in a place readily accessible by rail without this the utility of a central laboratory would be curtailed in many ways. Such a central laboratory in the Hills would, however, not be available either for clinical research or for the study of the conditions under which pathogenic micro-organisms exist in the different parts of India. Neither would it, an account of the distances to which material would have to be sent, be available for the bacterial diagnosis of doubtful cases of disease different parts of the country; we are, therefore of opinion that it is essential of Public Health laboratories should be established in the chief down presidencies and provinces, and these laboratories ought, we think that not only with a view to their being utilised for directly practical purposes, but also with a view to their being utilised for purposes of research. These laboratories might with advantage be established in connection with the medical schools of the selected towns, where they could be utilised also for teaching purposes.

Remarks by the President on the Advisability of Improving and extending teaching in Public Health

In the opinion of the President this utilisation of the Public

Health Laboratories would greatly increase their scientific usefulness, while the efficacy of the teaching carried on in them would be enhanced by the association with research work. The President has elsewhere pointed out that insanitary conditions exist in the rural as well as urban districts which urgently call for improvement and in his opinion these conditions are in great measure caused by want of information on the part of the people regarding the most simple and elementary requirements for healthy existence, with the result that, irrespective of deaths produced by infectious diseases, the general mortality from other preventable diseases is extremely high. As Native practitioners are brought into closer relationship with the people than European practitioners, the President, considering that they are thus more frequently in a position to give simple and elementary, but still valuable, instruction and advice to Natives in matters pertaining to healthy existence, and being of opinion that the recommendation above made to employ Assistant Surgeons in Sanitary work would largely depend for its success upon the thoroughness of their education in sanitation, deems that it is advisable to improve and extend the teaching of Public Heath in the Medical schools where the Native Medical Practitioners and Assistant Surgeons are educated. This might, the president thinks, best to done, and thereby much benefit conferred upon the people of India, by —

(a) restricting the Public Health teaching appointments in the medical schools to professors or teachers specially qualified in the subject;

(b) providing that the Public Health Laboratories recommended to be established in each Presidency and Province should be attached to the Chief Medical School of the Presidency and Province, and should be properly equipped not only for purposes of clinical and scientific research, but also for practical instruction in Public Health; and

(c) requiring that all candidates for medical degrees on licences should go through a course of effective practical instruction in one of these laboratories, in addition to the qualifying course of systematic lectures in Public Health elsewhere attended.

Organisation of the Permanent Staff of the Sanitary Department

Our recommendation with regard to the organisation of the Sanitary Department are as follows :

(1) We recommended that all the members of the Sanitary Department should be borne on one list.

The provision that the members of the Sanitary Department should all be borne on one list would have great advantages in facilitating the training of Medical Officers of Health. Another advantage would be that it would be possible to transfer a member of the Sanitary Service who had gained experience in connection with a particular epidemic disease or a particular sanitary measure, to any locality where that experience might be required. A further advantage would be that stagnation would be avoided and that active and tactful Medical Officers of Health would find fresh stimulus to exertion in the knowledge that their work would come under expert scrutiny and that promotion to a higher post would be open to them.

(2) We recommended that all appointments in the Sanitary Department should be made by the Head of the Department, subject to the approval of the Local Government, and that all the members of the Sanitary Department, whether engaged on executive duties as Medical Officers of health or on exclusively scientific or scientific and teaching duties relating to Public Health should be placed directly under the orders of the Head of the Sanitary Department; and one or more inspecting Medical Officers of Health might, we think be appointed to assist the head of the Sanitary Department in his work of Supervision.

(3) We recommend that the Head of the Sanitary Service should occupy the position of Sanitary Commissioner to the Government of India. In view of the new administrative duties, which we would propose to commit to this officer, the majority of us think that the office of Sanitary Commissioner to the Government of India should be erected into a separate office, and that it should not, as at present, be held in conjunction with the Director-

Generalship of the Indian Medical Service. We consider that, besides controlling the Sanitary Service and advising the Supreme Government on all matters relating to Public Health, the Sanitary Commissioner should inform himself, as far as necessary by personal visitation regarding the insanitary conditions, sanitary action, and prevailing diseases in all parts of India; that he should review the work of the Scientific sanitary establishments; and that he should prepare an annual report dealing with these subjects. In order to that his duties may be efficiently performed, we also consider that he should be provided with an adequate medical and clerical staff, and be supplied with reports bearing on the above-mentioned subjects, especially including reports on sanitation and on Vital Statistics, from each of the Presidencies and Provinces.

(4) In view of the importance of the functions of the Sanitary Department and of the Imperial interests which are involved, and in view of securing that absolutely independent advice on sanitary matters should be placed directly before Government in a country, where owing to the absence of independent medical public opinion, too much weight is likely to be given to the possibility of administrative difficulties arising in the carrying out of sanitary measures, and finally, with a view to avoiding the delays incidental to the submission of proposals to Government through an intermediary, we recommend that the Head of the Sanitary Department should be made a Secretary to Government.

INDIAN FAMINE COMMISSION, 1901 — REPORT[1]

1901

President	Mr. A.P. Macdonnell
Members	Mr. F.A. Nicholson, Mr. J.A. Bourdillon, Mr. Syam Sundar Lal

Appointment

The Indian Famine Commission was constituted under the Government of India in 1901.

Terms of Reference

The committee was directed

(i) to examine the administration of relief in all its branches during the famine of 1899,
(ii) to examine the cost of operations,
(iii) to examine the extent of mortality;
(iv) to consider what new problems have arisen, and how far events confirm the wisdom, or suggest the amendment of the recommendations made by the last commission.
(v) to look into the questions of the collection of the land revenue, and the grant of advances to agriculturists,
(vi) to investigate the existing practice with regard to loans to cultivators in the several provinces; and
(vii) to advise to the necessity for revised instructions on these important subjects.

Contents

Part-I—Historical retrospect; Scope of enquiry; Appreciation of the character and results of the relief measures; Scheme of the Report. **Part-II**—Administration of relief — the famine codes.

Superintendent, Government Printing, Calcutta, 1908.

Standing preparations; Lessons of experience; Danger signals; Order of relief measures; Class of works; Number of works and special tests; Contact of works; Organisation on works; System on works; Taxes; System of measurement and payment; Wage scale; Gratuitous relief; Rains policy; Closure of relief; Aboriginal tribes; Immigration from Native States; Medical and sanitary; Mortality; Preservation of cattle; Railways; Weavers; Orphans; Suspensions and remissions of land revenue; Advances by Government. **Part-III**—Introductory; Pressure of the land revenue; Suspensions and remissions of revenue; Agricultural banks; Advances by Government; Indebtedness in the Bombay Presidency; Agricultural development; Conclusion.

Object:—The aim of the enquiry would be to restate the principles by which alone famine relief on a great scale can be successfully administered. In so doing we shall not ignore the peculiarities of local circumstances, or to attempts to feeter the discretion which Local Government should always exercise within the limitations of accepted principle. So the need is to trace the course of a famine from its start, to indicate the dispositions by which it should be faced the measures by which it should be met and the tactical errors which should be avoided in combating it. Recommendations would be made which would bear upon the prevention of famine in future.

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Recommendations

It is desirable to fix the relief point low in order to secure that enquiry is made in all cases of extensive crop failure. In the case of widespread crop failure relief should proceed from the general to the particular. In such a case general estimates for homogeneous tracts or groups of villages or larger territorial areas should be made; and upon these estimates uniform suspension (i.e. of revenue in *ryotwari* tracts, and of rent in *Zamindari* tracts) should be worked out.

If the calamity is local and isolated relief should proceed from particular to the general.

In Zamindari tracts if the revenue payer is himself the cultivator, the considerations which apply to a suspension of rent should determine in his case the suspension of revenue; but, if—

he is a rent receiver, the suspension of revenue should be proportionate to the suspension of rents.

An early decision should be reached as to the amount of suspended revenue which should be at once remitted, and that the balance should be spread over two or three years for collection. Instalments should be fixed, and that the whole amount not be left over from harvest to harvest at the discretion of the local officers. It may not be possible to collect the instalments fixed; but even so, uncertainty in collection is less oppressive and demoralizing than uncertainty in demand.

Remissions should start with the cultivators, i.e. in *ryotwari* tracts the ryots and in Zamindari tracts the tenants. If the calamity has been widespread, remissions should be uniform with a view to the general relief of the cultivators. If the calamity has been local and isolated, remissions should follow individual enquiries as to the circumstances of the cultivators.

In Zamindari tracts; if the revenue payer is himself the cultivator, the considerations which apply to the remission of rent should determine in this case the remission of revenue, but if he is a rent receiver, the remission of revenue should be proportionate to the remission of rent. The treatment for the rich and poor should be same in this case. But there may be cases when a liberal policy may require for the poor proprietor a remission of revenue more than proportionate to the remission of rent.

It is necessary to establish some organisation or method whereby cultivators may obtain, without paying high rates of interest, and without being given under facilities for increasing debt, the advances necessary for carrying on their business. The *Sahukar* though as essential as the ploughman, sometimes becomes a incubus upon the agriculture. The usurious rates of interest that he charges and the unfair advantage that he takes of the cultivators necessities and ignorance have over large areas, placed a burden of indebtedness on the cultivator which he cannot bear. Due to process of compound interest this burden of indebtedness has become hereditary and retains the cultivating classes in poverty from which there is no escape. With the State assistance there is no way out. Mutual Credit Association should be formed by the cultivators and a Central Agricultural Bank should be established to deal with such groups of associated cultivators in each village than to make any attempt to deal with each cultivator singly.

The objects of the Agricultural Bank of this kind would be :

1. to enable its members to obtain loans at reasonable rates for agricultural purposes by placing them in a favourable position to borrow, and by assisting in the creation of a new credit, which individually they did not possess.
2. to provide them with a same place, in which to deposit their small savings.
3. to encourage thrift, by holding up before the eyes of the members the principle that money should not be borrowed unless for reproductive purposes.
4. to promote co-operation among the village community in all agricultural affairs.

The principles of the operations of the bank should be —

1. There should be unlimited liability : members must be jointly and severally responsible for all the obligations contracted by their society.
2. The area in which the village institution works must be well defined and restricted to narrow limits.
3. Members must be carefully selected, and none admitted but there of approved character.
4. All services in connection with the banks administration must be gratuitously rendered.
5. There should in general, be no paid up capital.
6. All net profits are payable, not as dividend to members, but to the reserve fund, which must be indivisible.

In the tract of the country to be served by village banks there doubtless will be found influential landlords, merchants, and others who apart even from their desire to take part in a movement for the public good, will find it to their interest to lend their aid. If will be possible to organise then gentlemen into a society for the purpose not only of providing funds for financing the village banks, but also for the purpose of stimulating their formation and guiding their action. The money may be subscribed in shares, each of small account and bearing interest say at 4% per annum. Such a society should be called the organisation society.

In course of time, and when village banks have taken root, the Organisation Societies in a distinct or even in a division may be amalgamated; when this happens the Central Society would take on itself the functions of financing and controlling all village banks in its share operation.

Thus the Organisation Society would, in fact, be an intermediate stage of development.

Duties of Organisation Society would be :

1. to promote the knowledge of the principles of co-operative banking in the locality.
2. to organise village banks and to supervise their working.
3. to grant advances to village banks under its supervision.
4. to arrange for the proper audit from time to time of the bank's books.

In many districts there may be large landlords who may themselves wish to establish village banks on their estates and to advance to them, at reasonable interest, the money required for their operations. Such landlords should also be encouraged. But in all cases, whether the bank is financed by one capitalist or by a society of capitalists, there should be strict attention to business methods and regularity. To ensure this, external supervision and audit are essential.

The previous steps taken by the Government in the above field were that Land Improvement Acts were passed. First was passed in 1883 which was recommended by Famine Commission of 1880. But then some defects were found in 1883 law so another Act (XII) of 1884 was passed. One of the three great objects of the Act of 1884 was to "provide for loans being made to village communities or other associated agriculturists". This principle was applied with great success during the famine of 1899. But this system may not be successful on another occasion. Its beneficient range of advances may not be extended to deserving by poverty striken cultivators because its rules lay stress on for the security of real property. Certain improvements on the Acts of 1883 and 1884 are recommended. Some help may be obtained from official agency, and some of the stiffness and the slowness of the present machinery may be removed. Hard and fast rules limiting the discretion of collectors, as to the classes to relieved and as to the extent of the relief, are inconsistent with the present policy. It is a good rule and has worked well in practice. We strongly recommend the adoption of this rule wherever it is not at present in force. It is peculiarly suited to advances on a joint bend, which it is also calculated generally to popularise. And it is to the principles of the joint bend and personal security that we look in the future on the greatest benefit from there loans.

Further it is recommended that the material condition of the cultivators be improved, whereby they may be enabled to withstand the pressure of hard times; and nothing mere impedes such improvements than an agrarian system, under which the cultivators fail to reap the full fruits of their industry and one kept in a state of indebtedness. The main features of the new agrarian system should be (*a*) the creation of a territorial unit of land revenue assessment which is called "the field", (*b*) the assessment of land revenue on each "field" independently, each thus becoming a separate holding; (*c*) the recognition of the recorded occupant of "the field" as possessing complete proprietary rights over it, subject only to the payment of the revenue or tax assessed on it; and (*d*) the punctual recovery of the land tax from the recorded occupant in lead years as in good. Thus the system was derived for small cultivators, there was no intention to create large holdings. According to the "field" was designed to certain "the extent of land capable and being cultivated by a pair of bullocks". This was the theory : but the facts of existing holdings and their boundaries were accepted and fitted, as best might be into the new scheme. But in practice the result was that due to the rigidity of the revenue system forced the cultivator in debt, while the valuable property which they held made it easy to borrow and thus some have lost their lands.

Following legislation measures should be taken in order that the existing situation of the cultivation may be improved.

1. The account between debtor and creditor should be investigated, and a fair sum should be fixed to be paid by the former to the latter in liquidation of the debt.
2. The average produce of the holding should be ascertained, and its money value should be expressed in cash.
3. The surplus produce, after providing for the subsistence of the cultivator and his family and the necessities of cul-

tivation, should be appropriated to the payment of debt provided that such appropriation shall not be continued after the lapse of a term of years.

4. In substitution for (1), (2) and (3) the holding should be made over, at the land tax assessed, to the creditor in usurfructuary mortgage for a term of years.

In either case the holding should be declared free of debt at the end of the term.

Further Land Records System (for the collection of land revenue) should also be improved. These improvements consist chiefly in the better organisation of the Land Records staff, in the mapping and registration of every plot contained in the field, in the maintenance of a correct map by the village accountant, and in the due registration in the village records of all particulars regarding ownerships, encumbrances and cultivating rights.

Above all, there should be a real record of all proprietary rights in land, and to this end registration of title in the village register should be enforced. At present there is no precise information as to the actual ownership of the land, and the entries in the village papers are often at variance with the facts. The result is that, when the revenue falls due, and the actual cultivator, who is not the owner, protects that he is not responsible, the local officials are reduced to a shrewd guess as to who the responsible party may be. This throws an enormous power into the hands of the village accountant, a subordinate official, who in every province, requires to be kept under strict contract.

Lastly for agricultural development Provincial Agricultural Departments should be expanded. There is indeed necessity for improving the means of transport by an increase of the rolling stock. To put the food supply of the country in circulation was necessarily, the first object of a wise famine policy, to protect and develop the supply itself should be its second object; and this is the function of agricultural development generally, and of irrigation in particular. For storage tanks, reservoirs and, above all, irrigation wells the scope and the necessity are very great.

The Indian cultivator is not ignorant of agriculture, but in the utilisation of his hereditary skill, in economy of the means of production, and in the practice of organised self help the Indian cultivator is generally ignorant and backward.

Conclusion

These hopes for the future are the seal of the past. In our opinion their complete and lasting fruition depends no less on success in evolving the spirit of self help and thrift among the people than on securing their crops from drought. The recommendations which have been made are the outcome of careful study of the past experience and of the incidents of the last famine. Like other famines it had its successes and its failures, which convey lessons of encouragement and warning. But through all almost every responsible officer did his best

INDIAN IRRIGATION COMMISSION, 1901 — REPORT[1]

SEPTEMBER 13, 1901

President Sir Colin C Scott-Moncrieff
Members Sir Thomas Higham; Mr. John W.P. Muir-Mackenzie; Mr. Denzil C.J. Ibbetson (up to 18-2-1902); Diwan Bahadur P. Rajaratna Muddaliar.
Secretary Mr. W.B. Gordon.

Appointment

The Indian Irrigation Commission was appointed by the Governor-General in Council vide Resolution No. 13-61-16 dated 13th September, 1901.

Terms of Reference

(*i*) To ascertain the utility of irrigation under local conditions of agriculture, whether in generally increasing the produce of the land or in securing it from the effects of failure of rainfall.

(*ii*) To report upon the extent to which irrigation has been provided by works constructed by the State and the results — productive, protective and financial — which have been attained.

(*iii*) To determine the scope which exists for further extensions of State irrigation works, with particular regard to such proposals for new works as may be laid before the Commission by local officers, and to estimate in general terms, after considering the results attained on completed projects and the data available from others which, whether sanctioned or not, have been investigated in sufficient detail, the probable net cost to the State of carrying out such extensions.

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[1] Superintendent of Government Printing, Calcutta, 1903, 4 vols.

(*iv*) To consider the extent to which local capacities for irrigation have already been utilised by private individuals. There are in some districts a great number of private tanks or canals on which a considerable area of cultivation depends, and the question of stimulating private effort in extending such works deserves careful consideration. It may be found that when irrigation ordinarily yields too small a profit to attract the investments of private capital, the Government can extend it more economically by the grant of loans, or by foregoing the recovery of a portion of its loans, than by itself undertaking the construction of works of this class by systematic arrangements for including them in the provincial programmes of relief works, and by executing them as far as may be possible by relief labourers on occasions of famine. Under this head also falls the important question of the extension of well cultivation, which in many tracts will probably afford greater and more reliable protection than any other form of irrigation work. The attention of the Commission is particularly invited to this branch of the subject.

(*v*) To consider the character and utility of the works on which relief labour has been employed during the late famine; to make recommendations, whenever possible, either for the completion or definite abandonment of such works as have not been completed; to examine the existing programmes of relief works, and to suggest the arrangements permanently required for revising and maintaining them in the most efficient manner so as to ensure the application of relief labour as far as may be possible to works which will have a real protective value. It is essential, with a view to the possible recurrence of famine, that in each province the arrangements for meeting it and for the employment of local labour should be in so advanced a state that operations may commence, as part of a continuous programme, without the dissipation of force or the delays resulting from hastily prepared and often imperfect schemes.

Contents

General Preface; Preliminary Survey; Limitations of Irrigation;

State Irrigation Works; Scope for further Extensions of State Irrigation Works; Private Irrigation Works; Loans for Improvements; Artesian Wells; Classification and financing of Irrigation Works; Methods of Charging for Water; Establishments; Hydraulic and Agricultural Experiments; Famine Relief Works and Programmes; Summary and Conclusion.

Recommendations

Punjab

In the Punjab we found a complete scheme known as the Lower Bari Doab, which had been fully worked out and submitted to the Government of India for sanction. We proposed, with great reluctance, the postponement of this important scheme until an alternative scheme for irrigating the same tract by means of a canal from the Chenab, to the carried across the valley of the Ravi, could be further examined.

Sind

We have recommended a continuance of the present policy of extending and developing to the utmost the existing inundation canals in Sind, and we understand that by this means, the irrigated area may be increased by at least 400,000 acres.

Gujarat

An attempt be made to find suitable sites for storage works on the Sabarmati, Mahi, and Nerbudda rivers, either in British territory or in the adjacent Native States.

Bombay Deccan

Our principal and most important recommendations for large works have been made for the protection of the Deccan districts in the Bombay and Madras Presidencies.

Madras

For the Deccan districts of Madras we have recommended that immediate steps be taken to improve and extend the Kurnool — Cuddapah Canal, and to make a complete investigation of the

Tungabhadra project, which, if carried out, will be one of the largest and costliest irrigation works in India.

Other large works which have been proposed in Madras are storage reservoirs on the Cauvery and Krishna rivers.

Bengal

We have proposed that a scheme for a large storage work and canal on the Karnnassa river; to irrigate the Bhabua Subdivision in the Shahabad district, be investigated; and we recommend its construction of it can be anticipated to yield a return equal to that of the Sona Canals.

United Provinces

In regard to the United Provinces, we have strongly recommended the construction of the Ken Canal which will protect the greater part of the Banda district in Bundelkhand — a district which suffered so severely from famine in 1896-97. We have also suggested the possibility of diverting some of the Sardah water into the Ganges above Narora, so as to set free a portion of the supply in the upper Ganges.

Small State Irrigation Works

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In many provinces, such as Madras and the Punjab, there is room for the construction of new works, of smaller size than those which have generally been sanctioned as productive or protective, the construction of which has been prevented by the fact that the cost was changeable against general revenues.

Private Irrigation Works

A development of the present system of *takavi* advances for agricultural improvements, and, among other measures, a lengthening of the time to be allowed for repayment of the loans, and a reduction in the rate of interest.

Grants-in-aid, in tracts in which the people have become impoverished by famine, to those who have the will but not the means to undertake works of improvement.

More definite assurances, where these are necessary, of permanent or long-term exemption from enhancement of assessment on account of agricultural improvements.

The more extensive employment of relief labour on agricultural works, even when these will benefit only private individuals who will pay nothing in return for them; and the systematic inclusion of such works in the programmes of famine relief works.

Artesian Wells and Subsoil Water Supply

Experimental borings should be made in any tract liable to famine, in which conditions may appear exceptionally favourable for artesian action. In suitable localities, assistance should be given to the people in making borings for the purpose of tapping these supplies, and that the results should be systematically recorded in a subsoil water survey.

Programme of Relief Works

Some authority should be made responsible for seeing that detailed proposals for possible irrigation works are worked out and brought on to the district programmes, ready for use as occasion arises.

Administrative Measures

Operations should be started all along the line, and that every province be allowed to plan its own plan of campaign. At the same time it is, of course, expedient that the greatest and earliest activity should be displayed in those provinces or parts of provinces in which, according to past experience, there appears to be the greatest danger of famine, or which are in most urgent need of protection.

For greater protection against famine, reliance must be placed, not only on new state irrigation works, but also on the extension of irrigation by means of private works. For the construction of new State works the officers of the Public Works Department will be responsible; on the Civil officers will devolve the duty of encouraging and stimulating private effort.

Some Central Board or Authority should be constituted, and invested with the responsibility of regularly watching and reporting progress under all heads of the programme, and of guarding against any material deviation from the working plan for each province being made without the express sanction of the Government of India. Minor deviations in matters of detail might be permitted with the sanction of the Board.

For the prosecution of the programme of new State Irrigation works which me have recommended, a large and permanent increase in the strength of the engineer establishment will be necessary.

Native States

We have recommended that comprehensive surveys be made of all river basins in the Native States of Rajputana, Central India, Kathiawar, and Gujarat, so as to obtain a full programme of the most promising projects for canals and storage works.

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INDIAN UNIVERSITIES COMMISSION, 1902 — REPORT[1]

JANUARY 27, 1902

President	The Hon'ble Mr. T. Raleigh.
Members	The Hon'ble Syed Hossain Bilgrami; Mr. J.P. Hewett; Mr. A. Pedler; Mr. A.G. Bourne; The Reverend D. Mackichan; Mr. Justice Gooroo Dass Banerjee.
Secretary	Mr. R. Nathan.

Appointment

By a Resolution of the Government of India in the Home Department, dated the 27th January 1902, it was intimated that the Governor General in Council had decided, with the concurrence of His Majesty's Secretary of State for India, to appoint a Commission.

Terms of Reference

To inquire into the condition and prospects of the Universities established in British India; to consider and report upon any proposals which have been, or may be, made for improving their constitution and working, and to recommend to the Governor General in Council such measures as may tend to elevate the standard of Universities and to promote the advancement of learning.

Contents

Proceedings of the Commission; History of Universities in British India; Teaching Universities; Local Limits of the Universities; Proposals for New Universities; Constitution of the Universities; University and College Libraries; Graduates of the University; Affiliated Colleges and Institutions; Teaching; Examinations;

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[1] Government Central Printing Office, Simla, 1902, 93.+2 p.

University Funds; Legislation; Summary of Recommendations; Note of Dissent by the Hon'ble Mr. Justice Gooroo Dass Banerjee; Appendices A and B.

Recommendations

Teaching Universities

The legal powers of the older Universities should be enlarged so that all the Universities may be recognised as teaching bodies. Undergraduates should be left in the main to the colleges, but the Universities may make better provision for advanced courses of study and may appoint their own lecturers, provide libraries and laboratories, and see that residential quarters are maintained for students from a distance.

Local Limits of the Universities

The local limits of each University should be more accurately defined than they now one. Steps should be taken to remove from the Calcutta list the affiliated colleges in the Central Provinces, the United Provinces, the Punjab, etc. The Central Provinces and Central India should be assigned to Allabahad. The colleges Ceylon which send candidates to Calcutta should be transferred to Madras, unless the Colonial authorities are prepared to make more suitable provision for their needs. The arrangement under which the Punjab Government holds University examinations at Lucknow should be reconsidered.

If a college situated within the local limits of a University desires for any special reason to apply for affiliation in another University, its application should be addressed, in the first instance, to the local University, and the application should not be granted unless with the consent of both Syndicate and the sanction of the Government of India.

Proposals for New Universities

The question of creating new Universities should be postponed until the changes now propose in the constitution and working of existing Universities have been tested by experience.

The Senate

The authority by which Fellows one now appointed should be empowered to nominate a new State. The new governing body should be recruited mainly or partly from the existing Fellows, but the number should not exceed a maximum, to be fixed by statutory rule. One hundred would be a suitable maximum for the three older Universities, unless Madras should find a smaller number to be sufficient, and sixty would be sufficient in the case of Allahabad and Lahore. These numbers do not include *ex-officio* Fellows.

Power should be taken for the constituent authority to distribute the Fellows according to Faculties.

There should be in each University a Faculty of Arts, representing Languages, Philosophy, and History, and a Faculty of Science, representing the observational and experimental sciences.

The proportionate numbers to be assigned to the several faculties need not be the same in all cases. When 100 is the maximum, the following would be a suitable distribution: Arts 30, Science, Law and Medicine 20 each, and Engineering 10.

The permission to elect Fellows which has been conceded to certain graduates in the three older Universities, and the provision in the Act of Incorporation of each of the two junior Universities for the election of Fellows by the Senate, should be retained and confirmed by statute. The constituent authority should be empowered to appoint to the new Senate a suitable number of existing elected Fellows, not exceeding one-tenth of the whole, and it should be arranged that Fellows of this class shall vacate their places in such a way as to secure regular annual elections for the future. Power may be taken to introduce election by the Senate in the older Universities, or election by graduates at Allahabad and Lahore.

In some cases, and especially in the Panjab University, the list of *ex-officio* Fellows requires revision. The Director of Public Instruction should be, *ex-officio,* a Fellow and a member of the Senate.

In the University of Calcutta the Lieutenant-Governor of Bengal should be made Rector of the University, with precedence next to the Chancellor, but without prejudice to the right of the Vice-Chancellor to preside in the Senate.

Appointments to the new Senates should be for five years. In each year one-fifth of the appointed and elected Fellows should vacate their places.

All appointments should be made on the clear understanding that the person appointed undertakes to attend the meetings of the Senate. The travelling expenses of members residing at a distance should be paid. Power should be taken to remove the names of those who, by change of residence or otherwise, have ceased to be able to take part in University business.

Power should be taken to regulate elections, and, in the case of election by graduates, to prescribe, either generally or in reference to any particular election, the qualifications of the electors and of the persons to be proposed as candidates. The electors should be graduates of five, and the persons elected graduates of ten, years standing. There should be power to cancel the election of a candidate if the constituent authority is convinced, after due inquiry, that improper canvassing has been used on his behalf.

Existing Fellows, not appointed to the Senate, should be permitted to retain the honorary distinction of a fellowship. Where the Fellows have the right to elect a member of a local Legislative Council, or of any Municipal body, all existing Fellows should be privileged to vote in the election.

The distinction of an Honorary Fellowship may in the future appropriately be conferred on benefactors and others who have deserved well of the University.

No Fellowship should in future be conferred merely by way of compliment.

The Senate should be so composed as to give due weight to the opinion of the following classes of persons :—

(a) University and college teachers, especially heads of colleges.
(b) Persons distinguished by their attainments in any branch of learning and qualified to take part in University business.
(c) Representative members of the learned professions.
(d) Representatives of Government.

No voting by proxy should be permitted in the Senate.

A simple majority may suffice for the repeal or alteration of a Regulation, since the sanction of Government is also required in such cases.

Faculties

It is not necessary to insist on uniformity in the arrangement of Faculties. If Arts and Science be separated, there will be the five Faculties of Arts, Science, Law, Medicine and Engineering. Teaching may be fitly assigned to the Faculty of Arts, and Agriculture to that of Science.

The establishment of a Faculty of Oriental Learning, in which degrees (as distinguished from titles) would be conferred without English is to be deprecated. Even candidates in the examinations for oriental titles should be encouraged to add English to their acquirements.

Without forming a Faculty of Commerce the Universities might in cooperation with the Chambers of Commerce, meet the growing demand for good commercial instruction. It is not necessary to raise at present the question of granting a degree in Commerce.

It is neither practicable nor expedient to make provision for a Faculty of Theology.

Boards of Studies

The Senate, subject to proper values of nomination and election, should appoint such Boards of Studies as it thinks necessary from among its own members.

No book should be recommended by a Board, unless on the written report of some competent person who has read it.

Questions relating to examination papers may be referred to the Board, but the Punjab rule requiring all objections to be so referred is unsuitable. Such objections ought to be laid before the Syndicate which should be free either to dispose of them or to refer them to the Board.

The Syndicate

The rule which prevails at Calcutta and Madras, that no Fellow is eligible to be a member of the Syndicate unless he resides in or near the University town, should be abrogated.

The Syndicate should not be a large body. The minimum number may be placed at 9, including the Vice-Chancellor, and the maximum at 15.

The Director of Public Instruction should be *ex officio* a member and Vice-Chairman of the Syndicate. Except in this case, there should be no *ex officio* appointments.

The Syndicate should be elected by the Senate, the Syndics being chosen, subject to proper rules of nomination and election, in certain proportions to represent the several Faculty to include one or more Heads or Professors of colleges according to the following rule: where not more than two members of the Senate are elected to represent a Faculty, one at least shall be a college Head or Professor; where more than two are thus elected, a majority at least shall be college Heads or Professors in that Faculty.

This rule is not intended to limit the proportion of the teaching element in the Syndicate. The proportion laid down may be exceeded, but the minimum secured by the rule must be insisted upon.

The Syndicate should be recognised by law as the executive authority of the University, and some of its powers should be exercised independently of the Senate. It is undesirable that (a) appointments made by the Syndicate, (b) decisions in regard to affiliation and disaffiliation of colleges, and (c) exemptions from examination rules should be reviewed in the Senate.

Registrar and Staff

The Registrar should be a whole-time officer; he should be appointed by the Senate, with the approval of Government; his service should be pensionable; and his pay should be such as to secure the services of a person of high academic standing. In case of misconduct or neglect of duty, he should be liable to dismissal by the Syndicate, with the sanction of Government. When the Registrar is absent on leave, the Syndicate should have power to make an officiating appointment. No officiating appointment should be reviewed or discussed in the Senate.

The subordinate staff should be permanent, and the conditions of employment should be fixed by the Syndicate with due regard to this consideration.

University and College Libraries

Good reference libraries should be provided in connection both with Universities and Colleges in order that students may have an opportunity of farming the habit of independent and intelligent reading.

Graduates of the University

There should be in each University a register of graduates; a fee should be paid annually by those whose names and addresses are entered in the register; and each registered graduate should receive a copy of the Calendar.

The Senate should be empowered to remove from the register the name of any graduate convicted of an offence which renders him unfit to be a member of the University. The consent of two-thirds of the Fellows present and voting should be required for this purpose.

Where electoral rights are conferred on graduates, persons whose names are not on the register should not be allowed to vote.

It is premature to consider the establishment of a convocation of graduates.

Affiliation Rules

New affiliation rules should be so framed for each University as to secure—

(a) That no institution shall be admitted to affiliation unless on the fullest information. There ought, in each case, to be an independent report by the Director of Public Instruction or some other competent authority, showing why the new institution is required and what are the guarantees for its financial stability.

(b) That no institution, once admitted, be allowed to fall below the standard of efficiency required for affiliation. The Syndicate should satisfy itself from time to time on this point. In most cases information will be procurable from the Director of Public Instruction, and it will not be necessary for the University to appoint an Inspector or Board of Inspectors, but members of the Syndicate should make it a practice to visit the colleges within their jurisdiction. The Syndicate should have power to order a formal inspection of an affiliated college at any time.

Governing Body of a College

A college ought not to be dependent on the interest or caprice of an individual. Any surplus after the payment of salaries and other necessary expenses should be spent on the improvement of the college. There should be a properly constituted governing body for each college.

Teaching Staff of a College

The teaching staff must be adequate to the courses of study to be undertaken.

There should be in every college council or common room, in which the Principal and Professors should meet to arrange their work and compare notes about their pupils.

Buildings, Furniture, etc.

The Syndicates should use every effort to ensure that the affiliated colleges are decently and suitably housed, and that there is adequate provision for the health and comfort of the students.

Where space permits, the Principal and some of the Professors should reside in or quite near the college.

Colleges and their surroundings should be made more dignified and more attractive than, in many cases, they now are.

Discipline of Students

Indian students are rarely guilty of disorder, but they need close and friendly supervision, and each college should consider how this need is to be met. The system inforce in the Muhammadan Anglo-Oriental College at Aligarh is commended to the study of other residential colleges.

Residence of Students

Students should be required to reside (a) with parents or guardians, (b) in lodgings approved by the University or by the college to which they belong, or (c) in a hostel, which may be defined as a place suitable for the residence of students and under University or College supervision.

One or more of the members of the college staff should reside in or quite near the hostel. The Superintendent should not be an upper servant, but a person able to exercise more authority over the residents. If it is not possible to give each student a room to himself, the sleeping rooms should be large dormitories, which are more easily controlled than cubicles holding two or three students.

Hostels attached to a college should be directly under the control of the Principal, and each hostel should be reserved for members of the college, to the inclusion of outsiders.

In course of time the provision of quarters for all students not residing with parents or guardians should be made one of the conditions of affiliation, at least for new colleges.

Hostels ought not, speaking generally, to be built at a distance from the colleges to which they belong, or in an environment that is not clean and respectable.

Courses of Study

Affiliation should be granted, and from time to time renewed, not ingeneral terms, but with more exact reference to the subjects and courses of study for which the college can make adequate provision.

In considering whether the provision which a college proposes to make for a particular subject is adequate, the following points should be taken into consideration:—

(a) Whether the college can provide an adequate number of lectures. In many cases it may be found that the "adequate number" is considerably smaller than the number now given. Efforts should be made to discourage the kind of lecture which consists merely in dictating notes. The object of the lecturer should be to stimulate and guide the minds of his class; not to dispense them from the necessity of reading their books and thinking for themselves.

(*b*) Whether the college provides its students with adequate tutorial assistance. This ought in all cases to be regarded as an essential part of college work. Where a college possesses a body of Fellows, it is desirable that such Fellows should give a part of their time to tutorial work.

(c) Whether the students have access to a library and to laboratories, etc. where required. The student should spend only a limited number of hours per diem in class; during the rest of his working time he should be reading, writing and inquiring for himself—not committing his lecture notes to memory.

The certificate that a student has pursued a regular course of study should be so framed as to show that he has gone through a course of study, approved by the University as above described. All rules which require merely a percentage of attendance at lectures should be recast or abolished.

Fees

Two primary considerations should be observed in the settlement of fees: firstly, that they must not be pitched so higher as to check the spread of education, and, secondly, that they must not be fixed so low as to tempt a poor student of but ordinary ability to follow a University course which it is not to his real interest to undertake.

No poor but really able student should be excluded, by reason of his poverty, from the advantages of the highest education, but these should be secured for him not by charging nominal fees, by the indiscriminate bestowal of free studentships, or by the establishment of free colleges, but by a comprehensive and liberal system of scholarships. Scholarships should be provided by the State open to general competition as the result of University examinations, and tenable at any affiliated college, as well as by the managers of aided and private institutions for students at their own colleges. If free studentships are permitted, they ought not to exceed 3 per cent of the total number of students on the roll.

The Syndicate of each University should, in consultation with the managers, prescribe a minimum rate of fees for the colleges affiliated to it, after taking into consideration local, circumstances, the demand for higher education, and the ability of the class of students who are likely to attend the institution to pay adequate fees for such instruction. This rate will be primarily applicable to the circumstances of colleges which obtain no pecuniary and from Government. The State should fix the fees at both Government and aided colleges, at a rate higher than the minimum determined by the University, the rate at the former being necessarily fixed higher than at the latter class of colleges.

The University should deal specially with the case of colleges which are maintained by rich benefactors on condition that no fees are charged, or the promoters of which are induced by religions, patriotic or philanthropic motives to give their services as teachers free or for very small remuneration, with the express object of reducing the fees payable by students to the lowest point possible. Provided that the University is satisfied that such an institution is properly furnished with teachers; adequately equipped with teaching apparatus; is in receipt on no grant-in-aid from the state; and that the resources available to the promoters are sufficient to maintain it in full working order for a reasonable period, it should be exempted from the strict operation of the value prescribing a minimum rate of fees.

In the case of such exceptional institutions a limit should be placed on the number of students admitted on payment of no fees or on reduced fees below the minimum fee laid down by the University, such limit to be based on the strength of the teaching staff, and the facilities for instruction.

Transfer of Students

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No transfer should be permitted in the middle of a term, or indeed in the middle of a course of study, unless for special reasons to be recorded in writing by the college authorities, and reported to the Syndicate.

In the case of Government and aided institutions, the Education Department can make and enforce proper transfer rules. If the University is satisfied with the Government rules, it should require unaided affiliated institutions to observe them as a condition of their affiliation. In so far as the Government rules are insufficient, the University should itself make transfer rules, as has been done at Madras and Allahabad.

Fees should be paid terminally in advance, and the question of the amount, if any, to be refunded on the transfer of a student should be decided by the college.

College and School

When a college is connected with a high school, the college classes should be conducted in a separate building and under separate management.

Second-Grade Colleges

The Universities should decline to affiliate any new second-grade college. In the case of those now affiliated, the aim of Government and of the University should be to effect gradual separation, so that University students should receive their education in colleges properly so called. Those second-grade colleges which cannot hope to rise to the first grade ought to revert to the position of high schools. It may be left to each University to determine the period within which this change can be effected. When a second-grade college is badly equipped, or sends up a small number of students for the Intermediate Examination, it should be disaffiliated at comparatively short notice, and the stronger second-grade colleges should be required to choose between the status of a college and that of a school within some reasonable limit of time, and with due regard to existing interests. In this, as in all cases, the question of creating a new first-grade college must be decided in the first instance by the Syndicate, in accordance with the rules of affiliation.

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Recognition of Schools

The University should recognise only the following classes of schools : —

(*a*) Schools within its local limits recognised by the local Education Department in accordance with the departmental rules for the time being in force, and

(*b*) Schools in Native States which are certified by the Government of the State in which they are situated to be organised and conducted in general accordance with the educational rules in force in the province of British India with which it is politically or academically connected.

College Life

Every encouragement should be given to societies and pursuits which bring students together out of class, and in this connexion much importance attaches to games.

The Universities should provide places and occasions for brings men of different colleges together. They might, for instance, establish, reference libraries with reading and conference rooms for Professors, and rooms in which students could read and hold debates.

General Remarks on Teaching

The use of "Keys" should be in every way discouraged by the college authorities.

English

Text-books in English should not be prescribed for the Matriculation classes; the course should be described in general terms, a list of books being given by way of illustration. The list should consist chiefly of descriptive and historical books and should be so long as to exclude the possibility of all of them being committed to memory.

In the higher courses the books should be chosen as examples of language and style and should be studied more or less minutely. Books which deal with the history and criticism of literary works which the student has no opportunity of reading should not be included.

The English course for the M.A. degree should be combined with a course in a vernacular or in an eastern or western classical language.

Anglo-Saxon should not be included in the course of an Indian University.

Students, after they begin to specialise in Science, should not be subjected to a separate test in English.

Latin

Latin should not be made a compulsory preliminary qualification for medical students.

Inter-collegiate arrangements should be made for the study of Latin where there are several small classes in the same town.

Classical Languages of the East

The study of a classical language should be compulsory in both the Intermediate and Final Courses for the B.A. degree. A vernacular language of India should not be accepted as an alternative subject.

Teachers of Sanskrit should have a critical knowledge of the subject and should be acquainted with western methods of study. Their training should be such as to entitle them to the same status and pay as the Processors of other subjects.

In reading and writing Sanskrit the Devnagiri characters should be used.

To improve the study of Arabic, the following reforms should, where needed, be introduced:

(*a*) Well-chosen text-books in grammar should form a compulsory part of the course.
(*b*) Unseen passages and composition should carry high value in all the higher examinations.'
(*c*) A fair knowledge of English in addition to a scholarly acquaintance with the Arabic language and literature should be a necessary qualification for employment as a Professor of Arabic.
(*d*) The emoluments of an Arabic Professor, provided be possesses the qualifications stated above, should not be inferior to those of other Indian Professors.

To improve the study of Persian —

(*a*) Graduates with some guarantee of their Persian scholarship other than the Arts degree, with Persian as the second language, should be employed to teach this subject.
(*b*) Persian should not be accepted by itself as a subject for the M.A. course; it should be combined with some other classical or vernacular language of India.

Encouragement should be given to the examinations held for the grant of titles in oriental learning, but the Universities should not assume charge of these examinations unless they can be conducted efficiently, unless a standard can be maintained of which the Universities will approve, and unless the transfer will be in the interest of ancient learning.

Vernacular Languages of India

The inclusion of the vernacular languages in the M.A. course is recommended, and the course should be of such a character as to ensure a thorough and scholarly knowledge of the subject.

The establishment of professorships in the vernacular languages is an object to which University funds may be properly devoted.

Vernacular composition should be made compulsory in every stage of the B.A. course, but the subject need not be taught.

The principle should be recognized that verbal accuracy of rendering is not sufficient to constitute a satisfactory translation, but that it must be properly and grammatically composed.

Further encouragement should be given to the study of vernacular languages by the offer of prizes for literacy and scientific works.

The oriental side of the Panjab University should be maintained and the courses for the degrees of Bachelor and Master of Oriental Learning should be retained with the following important modifications. English, as a second language, should be made compulsory throughout the courses. Wherever possible, graduates with high honours on the English side should be appointed lectures, and they should be required to prepare their courses for publication. Funds should be set apart annually for the publication of these courses of lectures and for the compilation and publication of textbooks on subjects not covered by them. The Oriental College ought to be subject to the same rules of affiliation as other colleges connected with the Panjab University.

The example set by the Panjab University in establishing an oriental side should not be followed by any other University for the present.

The work of the school attached to the Oriental College is outside the scope of the University.

French

French should not, except for female students, be accepted as an alternative for a classical language.

Philosophy

The subject of Philosophy cannot be included in the Matriculation classes, but should form a compulsory portion of the Arts courses.

Courses in Philosophy should be defined by syllabuses. Suitable textbooks should also be recommended for study.

The following is suggested as an outline for the study of Philosophy:

(*a*) Intermediate course — Deductive Logic and elementary Psychology.
(*b*) B.A. course — Deductive and Inductive Logic, Psychology and Ethics, Natural Theology and the History of Philosophy.
(*c*) The M.A. course should include in addition to the books of Greek and German philosophers, suitable portions of some of the great systems of Indian Philosophy, to be read in English or in Sanskrit at the option of the student.

Mathematics

The subject of Mathematics should be compulsory in the Matriculation and Intermediate courses, and optional in the higher courses of the Arts and Science Faculties.

History and Political Economy

History should not be included in the Intermediate course, but should form an optional subject for the B.A. and M.A. degrees. Political Economy should be combined with it.

For the study of History, the subject should be defined by periods, books being recommended, not prescribed; some study of original documents should be introduced and some use of contemporary historians should be required. A reference library should be required. A reference library should be made available wherever History is taught. The course should be carefully adapted to the needs of Indian students.

In the study of Political Economy attention should be directed to the economic conditions with which the students are familiar, and they should be encouraged to investigate in a scientific manner the economic problems of India.

Science Courses

Students should not be required to pass in Science before entering on a University course.

Physics and Chemistry, should be optional in the Intermediate course.

The instruction in these subjects should include a regular course of practical experimental work. The University should not conduct a practical test as part of the Intermediate Examination, but each candidate should present a certificate from the authorities of his college, to the effect that he has duly gone through the practical course prescribed in the laboratories of the college, and that he has passed the college test examination in the practical work of the course. The written examination should be so devised as to elicit the fact of his having undergone this training, and the University should assure itself that in the college in which he has studied, he has had adequate facilities for receiving practical instruction.

The course of the degree of Bachelor of Science should consist of one of the two following groups of subjects:—

> Mathematics, Physics and Chemistry, or, Physics, Chemistry and Natural Science.

By Natural Science is intended one of the following Sciences:— (*a*) Botany, (*b*) Physiology, (*c*) Zoology, (*d*) Geology including Mineralogy and Paleontology.

One of the three subjects should be regarded as the candidate's special subject, and he should be subjected to a more severe test in it. For candidates studying the second group, the special subject must be the selected Natural Science.

Candidates following a literary and a scientific course, respectively, should receive the separate designations of Bachelor of Arts and Bachelor of Science.

In all examinations for the degree of B.Sc. the practical side must be made more prominent than has here to fore been the case. Practical examinations should be passed independently of the written examination, and should have a separate minimum of marks. Ample time should be allowed for a thorough and fair practical examination.

No special facilities in the way of a reduced period of study or a diminution in the number of subjects should be conceded to enable a Bachelor of Arts to proceed to the B.Sc. degree of *vice versa*.

A graduate in Science should be allowed to proceed to the higher degree of Master in Science by specialising in one of the subjects included in the B.Sc. course, and presenting himself for examination in that subject after some specified period after the time of his graduation as B.Sc.

The Doctor's degree should not be obtained solely by examination but should be awarded mainly on the ground of original investigation for a period of, say, five years, in the particular Science in which the candidate has taken his Master's degree.

General Outline of Courses

The following outline is suggested for the various Arts and Science courses:—

Intermediate Course :—

1. English.
2. Classical Language.
3. Mathematics.
4. One of the following :—
    (1) Physics and Chemistry, or,
    (2) Deductive Logic and Elementary Psychology.

B.A. Course :—

1. English.
2. Classical Language.
3. Philosophy.
4. One of the following :—
    (1) Mathematics.
    (2) History and Political Economy.

B.Sc. Course :—

One of the following groups of subjects :—
(1) Mathematics, Physics and Chemistry.
(2) Physics, Chemistry and Natural Science.

M.A. Course :—

Any of the following subjects :—

(1) Languages — the course to include either English combined with a classical or Indian vernacular language, or a classical language of India combined with an Indian vernacular.
(2) Philosophy.
(3) History, Political Economy and Political Philosophy.
(4) Mathematics.

M.Sc. Course :—

Any of the subjects included in the B.Sc. Course.

The Degrees of *Doctor of Literature* and *Doctor of Science* to be given to Masters of Arts and Science respectively after some years spent in original investigation.

Law

The study of Law should be postponed until the student has finished his course for the ordinary degree in Arts or Science. If he is intended for one of the lower grades of the profession, he should begin after the Intermediate course; if he is going to the Bar or means to take a degree in Law, he should begin after graduation. Jurisprudence should not be admitted as an optional subject in any course leading to the B.A. degree.

The method of instruction should be improved by introducing the system of teaching from cases.

Roman Law should not be made a necessary subject for a Law degree.

The question of creating or maintaining and improving an adequate Central School of Law should be taken up without delay at each of the Universities. The Professors of such a School, including any University Professors who classes in the morning or evening out of court hours. There should be a staff of tutors competent to help students in their reading, and a good Law library. In the governing body the Bench and Bar of the local High Court should be strongly represented.

Medicine

The system under which the teaching of Medicine is centralised in the Government colleges should be maintained.

The equipment of the medical colleges should be improved, especially as regards the provision of arrangements for practical work, and of classroom and hostel accommodation.

A medical college should be established in the United Provinces.

No person should be appointed to lecture on a particular branch of medical study unless he has devoted special attention to it and displayed special knowledge about it. A medical officer selected to lecture in a particular subject, either permanently or temporarily, should not be regarded as having any claim, owing to his position in the service, to be transferred to another professorship which may fall vacant.

Medical students in the University of Bombay should be required to pass the Intermediate instead of the Matriculation examination as a preliminary qualification for admission to the medical course. At Lahore no further qualification in Arts or Science need be required for the M.B. degree.

Medical students should not be required to qualify in Latin.

The Universities should continue to give licensces in Medicine and Surgery to those who qualify for them, as well as the degrees of Bachelor and Doctor of Medicine. The licensce should be a diploma and not a degree, and may be given to those who attain a some what lower standard in the examination for the M.B. degree in both extent and depth of knowledge, than those who will be entitled to obtain that degree.

Each University should revise its scheme of studies and examinations so as to provide for a preliminary scientific course extending to Physics, Chemistry and General Biology; to be followed firstly, by an Intermediate course of Anatomy, Physiology and connected subjects, and secondly, by a final course of Medicine, Surgery and other professional subjects.

It appears undesirable to separate Medicine and Surgery at the stage of the Bachelor's degree, but desirable that the Doctor's degree should be given for some special branch of study, a candidate being allowed to offer his own subject, and the University testing him as it thinks fit by examination or otherwise. A candidate for the Doctor's degree should not be required to have obtained a degree in Arts or Science.

Each University should establish a diploma of Sanitary Science as soon as adequate arrangements have been made for the proper teaching of Bacteriology, Sanitation and Sanitary Engineering.

Engineering

The Intermediate Examination should, in all Universities, be the preliminary test for students wishing to follow a course of Engineering.

The University should not itself undertake instruction in Engineering.

Such instruction as students may need in Mathematics, Physics and Chemistry, subsequently to having passed the Intermediate Examination, should be provide for in the Colleges of Engineering.

Great care should be taken to provide similar courses and to equalise the standards in the different Universities.

Further provision is needed for instruction in Mining and Electrical Engineering.

The training should be throughout of a thoroughly practical nature.

Agriculture

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The Universities should, as far as possible, encourage agricultural studies, and should consider the desirability of granting diplomas for proficiency in the theoretical and scientific as opposed to the practical side of an agricultural course.

Commerce

Studies useful for commercial pursuits should be encouraged as far as possible both by the Universities and by the Government. The Universities may perhaps help in the examinations of the London Chamber of Commerce or in any examinations which may be instituted by the Local Governments.

Teaching

The Universities should promote the training of all classes of teachers in the theory and practice of Teaching in every way in their power; and, where this has not already been done, arrangements should be made to hold examinations for the grant of licenses in Teaching. The University should provide suitable courses of lectures for teachers.

General Scheme of Examinations

The Previous Examination of the University of Bombay should be abolished.

The standard of the Matriculation Examination should be raised.

There should be uniformity in the nomenclature of the examinations and degrees in Arts and Science at the different Universities. The three examinations leading up to the Arts and Science degrees should be called the Matriculation Examination, the Intermediate Examination and the Examination for the degree of B.A. or B.Sc. respectively.

Matriculation

Colleges should not be permitted to matriculate students at their own discretion.

The Matriculation Examination should be improved by drawing away from the examination candidates who ought not to appear at it, and by raising the standard.

The Age Limit for Matriculation

A candidate should be required to have completed his fifteenth year at the date on which he appears at the examination.

No candidate should be allowed to appear for Matriculation more than three times, whether at one or several Universities. Power should be given to the syndicate to make exceptions to this rule for special reasons to be recorded in each case.

Private Students

Every private candidate for Matriculation should be required to obtain a certificate, which should only be given under special circumstances, from the educational Inspector of the circle within which he lives that, as the result of an examination held by the Inspector or of the ordinary test examination of a high school, it seems reasonably probable that he will pass the Matriculation Examination.

Pupils who ought to have come up from a recognized school, but have failed to comply with the rules, should not be allowed to appear as private students.

No private student should be admitted to the Intermediate Examination, or to the examination for the degree of B.A. or B.Sc., unless by a special order of the Senate, to be justified by reasons to be recorded in each case at the time of making the order.

Matriculation and Government Service

The conduct of a School Final or other school examination should be regarded as outside the functions of a University.

It will be of great benefit to the Universities if the Government will direct that the Matriculation Examination shall not be accepted as a preliminary or full test for any post in Government service. In cases where the Matriculation Examination qualifies for admission to a Professional Examination the School Final Examination should be substituted for it.

It will be advantageous if the School Final Examination can, in the case of those boys who propose to follow a University career, be made a sufficient test of fitness to enter the University. Failing this, the test arrangement would appear to be that the Matriculation candidate should pass in certain subjects in the School Final Examination, and be examined by the University with regard to any further requirements that may be deemed necessary.

Subject of Examination

Matriculation candidates should be examined in English, a classical language, Mathematics, History and Geography.

The examination in English should include unseen passages, grammar and composition, and Translation from the vernacular into English, and if the reduction in numbers will admit of it, there should also be an oral examination.

No candidate should pass who does not obtain 40 per cent in English and 35 per cent in each of the other subjects. A minimum of 30 per cent should be required in each of the English papers.

Examinations for Honours

There should be no separate Honours examination for the Bachelor's degree. The M.A. should be regarded as the Honours examination. This suggestion will involve the raising of the standard of the Pass examination in Calcutta.

Mutual Recognition of Examinations by Indian Universities

The standard of corresponding examinations in different Universities should be equalised as far as possible; and, given an approximately equal standard and good course shown by the applicant, it is desirable that one University should recognize the examinations of another antecedent to the examination for the degree of M.A. and the corresponding degrees in other Faculties.

Dates of Examinations

Examinations should be fixed at such dates that they may follow closely on the working term, that a vacation may be given immediately after them, and that the teaching may be, as far as possible, distributed over the rest of the academical year.

Places of Examination

The Syndicate should pay attention to the provision of suitable accommodation for the holding of examinations and should not leave this matter to the local authorities.

It should be left to each University to decide whether it will have few or may examination centres.

Appointment of Examiners

Examiners should, as heretofore, be appointed by the Syndicate.

Applications ought not to be invited, and while the syndicate should receive and consider any applications that are made to it, it should also, by means of inquiries made either by it self directly or from the Principles of colleges, endeavour to secure the services of the best examiners available.

Teachers should be permitted to examine in the subjects in which they teach; but whenever a teacher is appointed to be an examiner in a subject which he has taught to any students appearing at the examination, he should be associated with at least one other examiner, who has not been engaged in teaching the subject, and the examiners should then act as a Board and set the papers jointly.

The rule debarring a member of the Syndicate from being as examiner should be rescinded wherever it is in force.

When more than one examiner is appointed, the examiners should be formed into a Board; one should be appointed Chairman, and the Board should meet to set the papers and settle the results of the examination.

Papers should, whenever possible, be set and looked over by the same persons. When there are a large number of examiners, the papers should be set by a subcommittee of the Board.

Methods of Examination

The character of the papers set should, in many cases, be modified in order to discourage cramming and ensure to students the full benefit of careful study. Easy questions are best suited for this purpose. In Mathematical papers, problems, suitable to the standard of the examination should be appended to questions on book-work. A high percentage of marks should not be assigned to mere book-work.

The practice of noting the number of marks assigned to each question in an examination paper is open to objection. It is preferable that a candidate should be given a choice of questions in each paper and should be directed to answer only a certain proportion of those set, but in all advanced examinations, such matters of detail should be left to the discretion of the examiner.

When papers have been marked by different examiners, they should be returned to the head examiner, who should examine a certain number taken at random, with a view to assuring himself that the examiners are observing the same standard.

The Board of Examiners should be convened to settle the results.

Where a candidate has failed in one subject only and by not more than five per cent of the full marks allowed for it and has shown merit (which should be interpreted to mean has gained 50 per cent of the marks) in the aggregate of the other subjects, he should be considered to have passed. Grace marks and similar devices should be expressly forbidden.

In the Bombay Matriculation Examination the English papers are examined first, and the numbers of the candidates who pass in that subject are sent to the Registrar. In other subjects the examiners are directed to look over and mark only the papers of those candidates who have passed in English. This practice is recommended for general adoption.

Candidates should be permitted to know the marks they have obtained; they should be charged a free for the information. In the authoritative publication of the results of examinations, candidates should be entered in alphabetical order in the class to which they belong.

Examination by Compartments

Care should be taken, in framing the programme of an examination, to see that subjects are not so numerous as to lay an undue burden on the minds of the candidates; but if this condition is complied with, the examination should be treated as a whole, and not broken up into sections.

Candidates Failing to Pass

The case of each candidate should be dealt with separately, and the question whether he should return to college and go through the course of study or part of it over again should be left to the college. The certificate on which he reappears should be a new one and should show whether he has gone through any additional course of study since his failure. If a student who has passed or failed at an examination desires to go to another college, the transfer rules should require him to obtain a leaving certificate.

Percentages

Percentage statements should show not merely the number of candidates sent up but also the number of students in the second or fourth year's class as the case may be.

University Funds

The principle should be recognised that if the Universities are to incur additional expenditure in order to improve the education of their students, it is not unreasonable that they should charge higher feels, and each University should consider how far it can, by means of the resources already at its disposal and by raising its fees, find funds for new expenditure.

The scale on which the Governments supports and aids the colleges may be reconsidered in view of the increased expenditure to which the acceptance of the foregoing recommendations must lead. Unless by Government aid or otherwise the financial position of the Universities can be materially strengthened, the prospect of any thorough change for the better must be indefinitely postponed.

Legislation

An outline of the Legislation necessary to give effect to these recommendation is given in paragraph 195 of the report.

INDIAN POLICE COMMISSION, 1902 — REPORT[1]

JULY 9, 1902

President	Sir Andrew H.L. Fraser
Members	Mr. Justice Candy; Maharaja of Darbhanga; Diwan Bahadur S. Srinivasa Raghavaiyangar; Lieutenant-Colonel J.A.L. Montgomery; Mr. W.M. Colvin; Mr. A.C. Hankin.
Secretary	H.A. Stuart.

Appointment

The commission was appointed by the Resolution of the Government of India dated 9th July 1902.

Terms of Reference

(i) Whether the organisation, training, to strength, and pay of the different ranks, ranks of the district police, both superior and subordinate, food and mounted, whether an ordinary duty or in the reserve, are adequate to secure the preservation of the public peace and the proper investigation and detection of crime, and if not, what changes are required in them, respectively, in each province with regard to its local conditions, in order to attain these objects.

(ii) Whether existing arrangements secure that crime is fully reported or require to be supplemented in any way, and in particular, whether the village officers and the rural police in each province are efficient aids of the district police in the matter of reporting crime, and if not how the relations between the former and the latter can be improved.

(iii) Whether the system of investigating offences now in force in each province, the object being to provide of the full investigation of all serious crime, while avoiding interference by the police in trival matters, is capable of improvement, and if so, in what manner and whether the institution of fully organised Criminal Investigation Departments, either Imperial or provincial is recommended.

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[1] Government Central Printing Office, Simla, 1903, 276p.

(iv) Whether the form of statistical returns now adopted is satisfactory or capable of improvement, and whether the use to which such returns are now put as tests of police working is appropriate or not;

(v) Whether the general supervision exercised by the Magistracy over the police and the control of the superior officers over the investigation of crime are adequate to prevent oppression on the part of the subordinate police, and, if not, how they can be made so;

(vi) Whether the organisation of the railway police, its operation as between provinces and states; and its connection with the district police are in a satisfactory condition; and if not, what improvements can be affected; and

(vii) Whether the career at present offered to natives in the police in each province is sufficiently attractive to induce the proper stamp of men to enter it, and, if not, what steps can be taken to remedy this evil consistently with the recognized measure of necessity for European contract in the district charges.

सत्यमेव जयते

Contents

Introduction. Chapter I—History of Police Organisation in India. Chapter II—Popular Opinion Regarding the Police and Their Work. Chapter III—Village Police. Chapter IV—Regular Police : Organisation, Training, Pay and Discipline. Chapter V—Special Police Forces. Chapter VI—The Police in Their Relations to Magistrates and to Commissioners. Chapter VII—The Prevention of Crime. Chapter VIII—Reporting and investigation of Offences. Chapter IX—Prosecution of Offenders. Chapter X—Police Statistics and Records. Chapter XI—Strength and cost of the Police. Chapter XII—Summary of Recommendations.

Recommendations

All the members of the Commission were unanimous in their views and in their proposals, except that the Maharaja of Darbhanga differed from them on two points. This finding were — the police force is far from efficient, it is defective in training and organisation, and it is inadequately supervised; it is generally regarded as corrupt and oppressive and it has utterly failed to secure the confidence and cordial co-operation of the people. The proposals for reform submitted by the Commission are not, however, of a revolutionary character. They do not involve a complete subversion of the present system, thought they aim at its radical amendment. They consist mainly in suggestions for the maintenance and develop of indigenous local institutions so as to obviate the vexations interference of the police in cases of little importance and to promote the co-operation of the people with the police in those of a more serious character, for the restriction of the lowest classes of officers to the discharge, under the closer supervision of there more mechanical duties for which alone they are qualified, for the conduct of investigation by trained officers drawn from the better educated and more respectable classes of the community, for inspection of police work by carefully selected and trained officers of capacity and tried integrity, for supervision and control by the best European and Native officers available, and for organised and systematic action against organised and professional crime. They aim also at the removal of abuses which have been brought to light in connection with police work, at the employment of native agency to the utmost extent possible in each province without seriously impairing the efficiency of the service; at the attraction to the service of good Native officers by offering them suitable position and prospects, at the recruiting of superior European officers of a higher class and insisting on their coming more into touch with the people; and at the adoption on the part of the whole force of a more considerate attitude towords all classes of the community so as to secure as far as possible the confidence and co-operation of the people.

Among other things the Commission recommends—

(*a*) restrictions of unnecessary interference in ordinary police work or investigations on the part of the District Magistrates;

(*b*) responsibility of the District Magistrate to Government for the way in which he exercises his discretion in the matters of interference and supervision of the work of the police as well as that of the Subordinate Magistrates;

(*c*) the affirmation of the principle that the thief-catcher should not by the thief and that the District Magistrates should not as a rule, by to interfere with police cases; and that cases in which he is interested, or in which he has assumed the part of the police officer, should be sent by him to be tried by a Magistrate of the first class;

(*d*) the decision to improve the Subordinate Magistrates, with a view to make them more alive to their proper sense of duty and less prove to the unduly influenced by their desire to follow what they may fancy to be wishes of the District Magistrate or Subdivisional Officer.

RAILWAY COMMISSION, 1902 — REPORT[1]

NOVEMBER 6, 1902

President	Mr. F.B. Hebbert
Members	Mr. G.A. Anderson, Sir Allan Arthur
Secretary	Mr. C. Dove Wilson

Appointment

The Commission was appointed under the Orders of His Excellency the Governor-General in Council in pursuance of the Government of India, Public Works Department, No. 179 Railway Projects, Simla, on 6th November, 1902.

Terms of Reference

(i) To consider the best means of effecting broad-gauge Connection between the Indian System of Broad-gauge railway and the Ceylon railway on the same gauge. For the present it may be taken for granted that the Southern terminus of the proposed broad-gauge link will be Ramesvaram Island.

(ii) "Government of India will be glad if any advice which they may have to offer in regard to :—

- (*a*) the best means for linking Mysore with Southern India;
- (*b*) the Podanur-Palni (or Dindigul) Connection;
- (*c*) Suggested conversion to metre-gauge of everything West of Erode or Podanur."

Contents

Introductory Remarks; Proceedings and Evidence; Opening Remarks by the President; Witnesses; Report of the Commission; Appendices I to XXIX.

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[1] Superintendent, Government Press, Madras, 1903, 131p., 1 Chart.

Recommendations

(i) From a consideration of the evidence in regard to the needs of the districts lying South of Trichinopoly, the Commissioners have no hesitation in recommending as the southern most section of the required link, an alignment from Ramesvaram via Ramanad, more or less direct to Trichinopoly.

(ii) Northwards from Trichinopoly, the information before the Commission points, both from the Railway point of view and from that of the local interest of the districts traversed, to additional railway communication being required for the purpose of opening up the country in that direction. The balance of local evidence seems to be in favour of an alignment from Trichinopoly in the direction of Tirukkoyilur. But, from a point on that alignment near Chinna Salem or Kalla-Kruchi, the evidence given on behalf of the railways interested is in favour of a turn westwards to join the Madras railway at Salem, or Jalarpet, or somewhere south of the latter place. The information given to the Commission, however, establishes the fact that, as a through connection, the suggested diversion of the line towards Salem or Jalarpet would cause a long detour to traffic and force it over heavy grades. The Commissioner, therefore, do not approve of the proposed alignment from Chinna Salem Westwards, but recommend that the alignment should take a north easterly direction, roughly corresponding to the proposed by the Madras Government for the Trichinopoly-Tirukkoyilur railway – a project which, since the commencement of the Azhikal-Mangalore line, stands first in order of precedence on their list of new railways. As to the exact point at which the alignment should strike the South Indian Railway between the limiting points of Tirukkoyilur and Panrution the west and east respectively – which are referred to in the papers dealing with the Trichinopoly-Tirukkoyilur railway proposals as possible junctions with the South Indian Railway, neither the evidence given not the information before the Commission affords sufficient material for a definite decision.

(iii) It seems clear however that, whatever junction is selected between these limiting points the proposed broad-gauge link should extend thence northwards, either by a new line from Tirukkoyilur to Arkonam or by conversion of the metre-gauge from Villupuram to Madras – in the later case a third rail being laid from Villupuram and the point of Junction finally preferred, should it lie to the east or west of that place. The northern terminus of the new broad-gauge link, which the Commission recommend, would thus be either Arakonam of Madras according to which of the above alternatives is finally adopted as a result of the further investigations which the Commission think should now be made.

The link from Ramesvaram via Ramnad and Trichinopoly to Arakonam of Madras, on the alignment thus recommended, together with the projected connection from Warangal to the North-east branch of the Great Indian Peninsula Railway would complete the required connection between the broad-gauge systems of Northern India and Ceylon by the most direct route practicable. And, as regards the portion south of Arkonam, or Madras, the route selected would offer more favourable conditions for the haulage of through traffic than any alternative route. It would, also, interfere less with existing arrangements for the carriage of traffic, open out a larger area of new country requiring railway communication either for commercial or famine protective purposes, and follow an alignment more suitable for cheap railway construction, than any other proposal laid before the Commission.

A considerable amount of evidence was offered to the commissioners in regard to the strategical value of the various proposed alignments. The advise of the Commission on this point has not been specially asked for and the Commissioners will, therefore, only remark that a line which affords facilities for he conveyance of a considerable traffic with economy and despatch under ordinary conditions is less likely to be found wanting in time of emergency than lines not so favourably suited for trade. The location of the proposed link, on the alignment recommended by the Commissioners, would ensure its carrying an important traffic from the outset.

The Connection between Mysore and South India

It follows, from the recommendations made by the Commissioners above, for the broad-gauge link, that any necessity for the conversion, back to the broad-gauge, of the Trichinopoly-Erode section is eliminated, and the natural connection between Mysore and the South Indian and metre-gauge lines, namely, that originally proposed, via Erode, should, they consider, be adopted when required.

The Palghat-Palni-Dindigul Line

It being understood from the evidence preferred that the lines within the Coimbatore and Madura districts, which go to make this connection, will be undertaken by the Boards of the two districts concerned, the Commissioners recommend that it may be left to them to construct these lines in the first instance; also leaving to them the decision as to whether the alignment should run from Pollachi to Podanur junction and on to Coimbatore, or from Pollachi to Palghat. Bearing in mind, however, the possibility of this line in the future being made on the broad-gauge and extended east of Dindigul to meet the broad-gauge link, the commissioners recommend that, while it is made first on a light or narrow gauge formation, the alignment and the bridge masonry should be made suitable for a broad-gauge line.

The Conversion, to metre-gauge of the broad-gauge line West of Podanur

Such evidence as was tendered to the Commission in connection with the suggested conversion was opposed to it, as being uncalled for, and in this view the Commissioners concur.

Supplementary

In connection with the steps to be taken for completing the broad-gauge link between Ramnad and Arkonam, or Madras, recommended by the Commissioners, there are two alternatives, namely, either to make it on the broad-gauge at once, or to make it on the metre-gauge in the first place with formation, bridge masonry, and girders suitable for broad-gauge. In favour of making the link-broad-gauge in the first instance, is the evidence before the Commission that the district needs can be more rapidly met by the provision of district railway on the 2' or 2'6" gauge than by branches on the metre-gauge, to which they would presumably be laid, were the link constructed in the first instance on that gauge. The Commissioners were very much impressed with the Zeal displayed by the district boards for the construction of railways to serve their districts, and it seems advisable to encourage this spirit by allowing to provide lines of a light character, economical to construct and work and not in excess of the actual requirements of the case; while, judging from the comparatively poor character of much of the country to be served, it is probable that 2'6" gauge lines would prove more suitable in many cases than metre-gauge lines of the standard type.

Should the final decision in regard to the northern section of the link be in favour of Tirukkoyilur-Arkonam direct connection, the conversion to broad-gauge of the Renigunta-Gudur metre-gauge cross line, which the evidence before the Commission shows to be advisable even under existing circumstances, would become essential, in order to shorten through communication towards the north. The new line from Tirukkoyilur northwards would not improbably pass through Conjeeveram and, in that case, the existing line between Conjeeveram and Chingleput might be abandoned.

If, on the other hand, the decision be in favour of converting the Villupuram-Madras section to broad-gauge, it would be necessary to convert the Chingleput-Arkonam branch to the broad-gauge at the same time. It is understood that the Conjeeveram-Arkonam length was laid originally on an existing road and that a fresh location of this portion of the line is desirable.

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